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By HANK WIEAND BOWMAN

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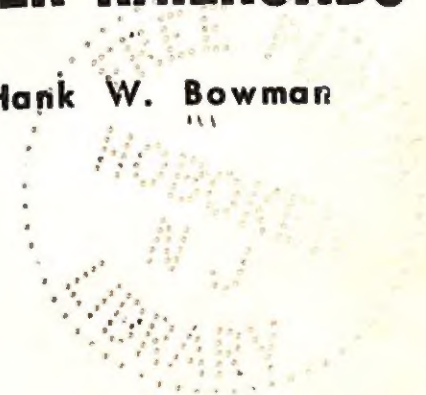
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PIONEER RAILROADS

by Hank W. Bowman

Railroads



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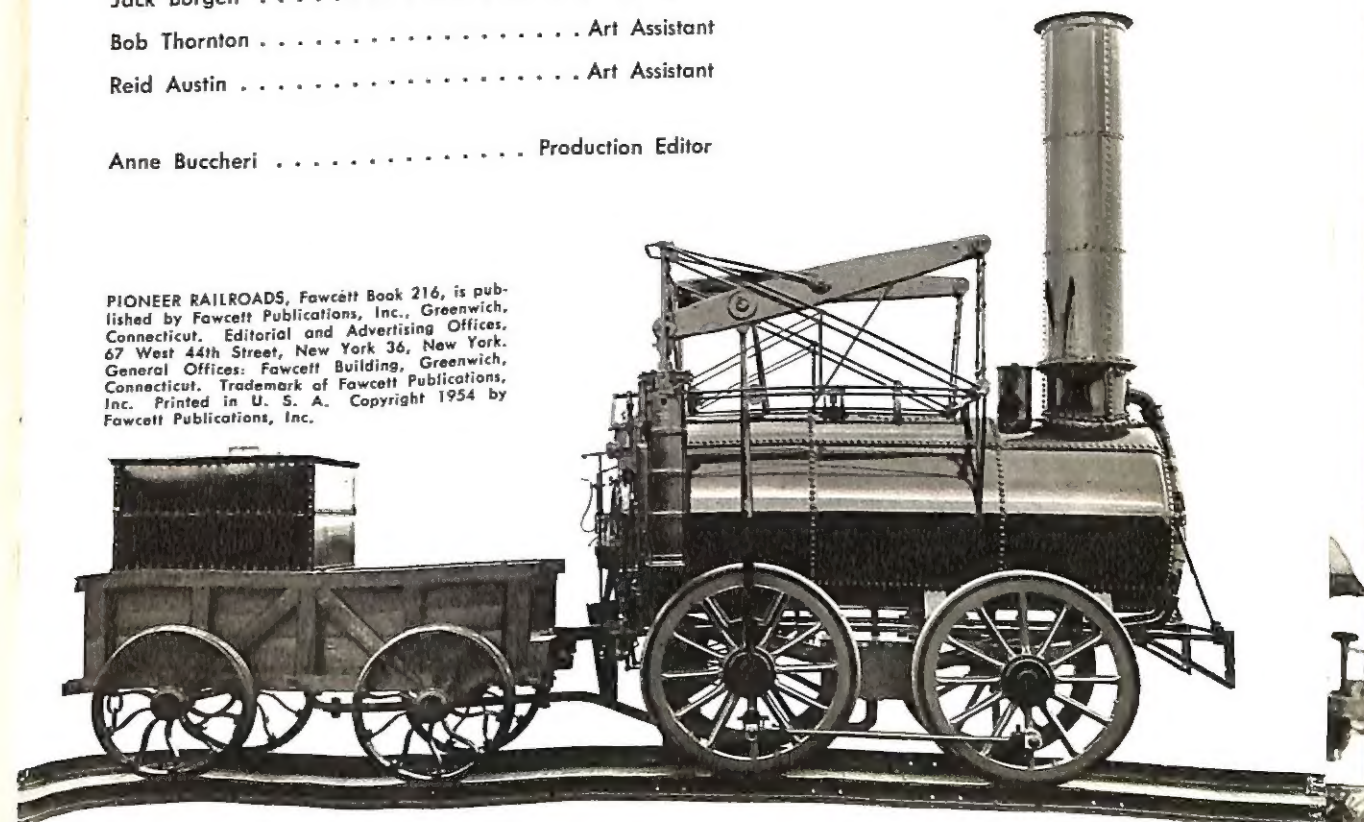
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AARR—Association of American Railroads
 AT&SF—The Atchison, Topeka and Santa Fe Railway System
 B&O—The Baltimore and Ohio Railroad Company
 B&M—Boston and Maine Railroad
 Burlington—Burlington Lines
 CNRS—Canadian National Railway System
 C,M,SP&P—Chicago, Milwaukee, St. Paul and Pacific Railroad Company
 C&NW—Chicago and North Western Railway System
 C,RI&P—Chicago, Rock Island and Pacific Railroad Company
 D&H—The Delaware and Hudson Railroad Corporation
 Erie—Erie Railroad Company
 IC—Illinois Central Railroad
 L&N—Louisville and Nashville Railroad Company
 N,C&SL—The Nashville, Chattanooga & St. Louis Railway
 NY Central—New York Central System
 N&W—Norfolk and Western Railway Company
 PRR—The Pennsylvania Railroad Company
 Pullman—The Pullman Company
 Ind. R&L Soc.—Railroad and Locomotive Society of Indiana
 SP—Southern Pacific Company
 Southern—Southern Railway System
 UP—Union Pacific Railroad Company
 Stevens Inst.—Stevens Institute of Technology

KEY TO CREDITS

Photos courtesy of railroads
 and associations listed at left.



INTRODUCTION

THIS book tells of these early few who had the vision to see a future for the "iron horse." It also tells of those who, once railroads' future seemed secure, tried and sometimes succeeded in taking over control of a work that had been consummated by the blood and toil of hardier but less canny individuals. This is the story of the early days of railroading, the wood burning era, the period of "snake head" rails and shaky wooden trestles. It isn't the whole story, that would take hundreds of volumes, but it is a sampling of the whole—enough to say, of this stuff early railroads were made.

Many people have generously helped to compile material used in this book. I am particularly indebted to Virginia Reilly, Librarian, Employees' Library, Robert M. Van Sant, Director of Public Relations, Herbert Oberender, Caretaker, Transportation Museum, L. W. Sagle and H. C. Weber, all of Baltimore and Ohio Railroad; Harry B. Ramsey and Daniel B. Priest of the New York Central System Public Relations Department and News Bureau; Miss E. M. Ferguson, Librarian, and G. E. Payne, Manager of Publicity, The Pennsylvania Railroad Company; Robert S. Henry, Vice President, Association of American Railroads; James P. Reinhold, Assistant to the President, The Atchison, Topeka and Santa Fe Railway System; K. C. Ingram, Assistant to the President, Southern Pacific Company; B. E. Young, Assistant to the President, Southern Railway System; D. R. Hackney, General Passenger Agent, The Nashville, Chattanooga and St. Louis Railway; R. R. Horner, Manager, Magazine and Advertising Department, Norfolk and Western Railway Company; George C. Frank, Assistant to President, Erie Railroad Company; George M. Crowson, Assistant to President, Illinois Central Railroads; Julian L. James, Editor, Employees' Magazine, Louisville and Nashville Railroad Company; L. F. Hanke, Executive Department, Burlington Lines; J. C. Noel, Manager, Press Bureau, Canadian National Railway System; W. A. Dietze, Public Relations Officer, Chicago, Milwaukee, St. Paul and Pacific Railroad Company; T. J. Zirbes, Jr., Editor—News Digest, Chicago, Rock Island and Pacific Railroad Company.

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I would like to acknowledge, too, valuable source materials prepared by the American Branch of the Newcomen Society of England and made available to me by the publicity departments of many of the roads already mentioned. And for their part in stimulating the continued interest in the fascinating subject of railroads, I would like to offer congratulations to the publishers of Railroad Magazine and Trains.

Hank Wieand Bowman
 Solebury
 Bucks County, Penna.



BIRTH OF THE IRON HORSE

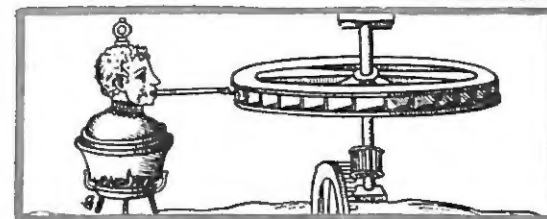


THE FIRST WAGONS DRIVEN BY STEAM ROLL OVER
ROADS OF RAILS IN ENGLAND DURING THE EARLY 1800S

The first known drawings of a steam locomotive, modeled in wood below, were made by Sir Isaac Newton in 1680. He envisioned jet propulsion by means of steam from a nozzle.
B&O



Oldtime Steam Cars



The Aeolipile, a primitive steam turbine of 130 B.C., was used by Father Verbiest in a first steam car, 1655.

TO PUT an exact date on the earliest concept of railroading is impossible. Developments leading to the beginning of the earliest railroads could be traced back to the Bronze Age in Egypt and Southwestern Asia when wheels were first put to use as a means of transportation—as early as 2500 B.C. Heron of Alexandria, a Greek mathematician, whose exact date of birth is not known and whose life has variously been ascribed to periods ranging from the second century B.C. to the third century A.D., recorded an early application of steam to power. Heron's invention was a cylindrical metal container with a curved spout protruding from one side, set in a gimbal system so that when the water contained in the pot was heated, steam formed and the pot would whirl. Simple—but it was a steam engine.

The combination of rails and wheels was used as early as 1630 near Newcastle, England, where horsedrawn vehicles were dragged along U-shaped wooden tracks.

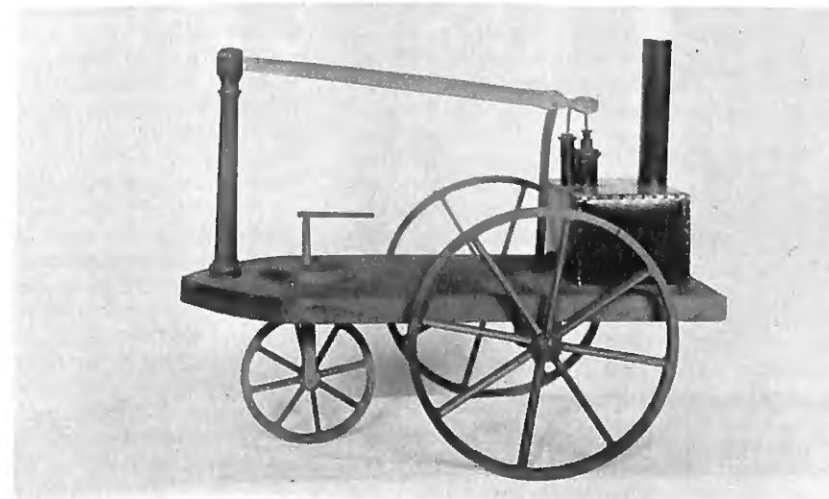
In 1680 Sir Isaac Newton, English mathematician and philosopher, made detailed scale drawings of a steam locomotive although he never carried his idea beyond the drawing board stage.

Thomas Newcomen, a blacksmith of Dartmouth, England, and his partner, Savery, in 1705 patented an early steam engine, then called a fire engine. It was used to pump water.

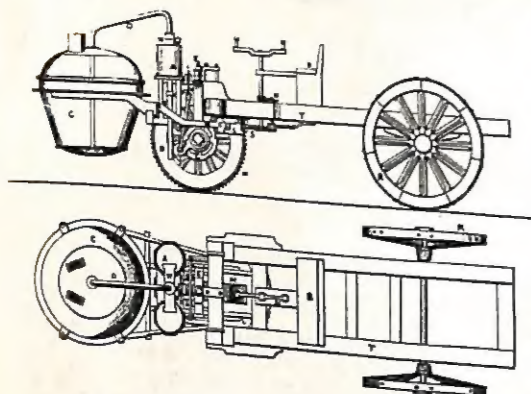
In 1769 Captain Nicholas Joseph Cugnot, a French military engineer, designed what is believed to have been the first steam-

B&O

In 1784 William Murdock, pupil and assistant of James Watt, tested his own locomotive invention, England's pioneer high pressure self-propelled vehicle.

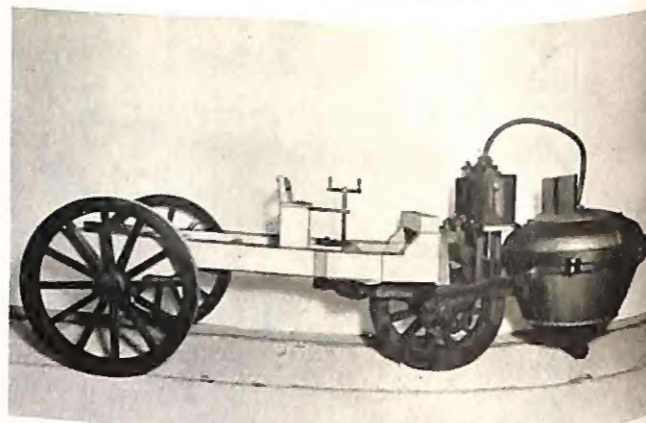


Failure by Nicholas Joseph Cugnot to install brakes on his 1769 engine, the first ever to move over land by steam, set back French development 60 years.



Oldtime Steam Cars

Details of Cugnot's invention show it to be a three wheeled vehicle intended as an artillery tractor to transport heavy cannon. It could travel 3 mph.



driven road vehicle. Captain Nick's operation of his steamer was short-lived for he had overlooked an essential component—a brake. By the time colonial America was paving its way for independence, rails, wheels and steam motivation of wheels all had been carried forward at least to a crude form of satisfactory use.

Cugnot's three-wheeled invention, the engine of which resembled a huge bean pot suspended forward of a single front wheel, could not be classified a railroad locomotive. His intention had been to build a self-powered carriage to carry heavy cannon, but his ponderous machine did move, for however a short stretch, and was the world's first true locomotive.

James Watt, a Scottish inventor and manufacturer of astronomical instruments, was called in to make repairs on Newcomen's 1705 steam engine nearly a half a century after Newcomen's death. He not only rebuilt the Newcomen steam engine into proper functioning condition but added to it the innovation of a rotary motion, making possible the designs for the first practical steam locomotives. Watt's first wholly successful reciprocating steam engine was built in 1774. This was a single cylinder, single action engine. In 1782 he invented a steam engine with steam injected alternately into both ends of a cylinder, producing a push-and-pull motion—the forerunner of double action engines.

ENGINES THAT MOVED

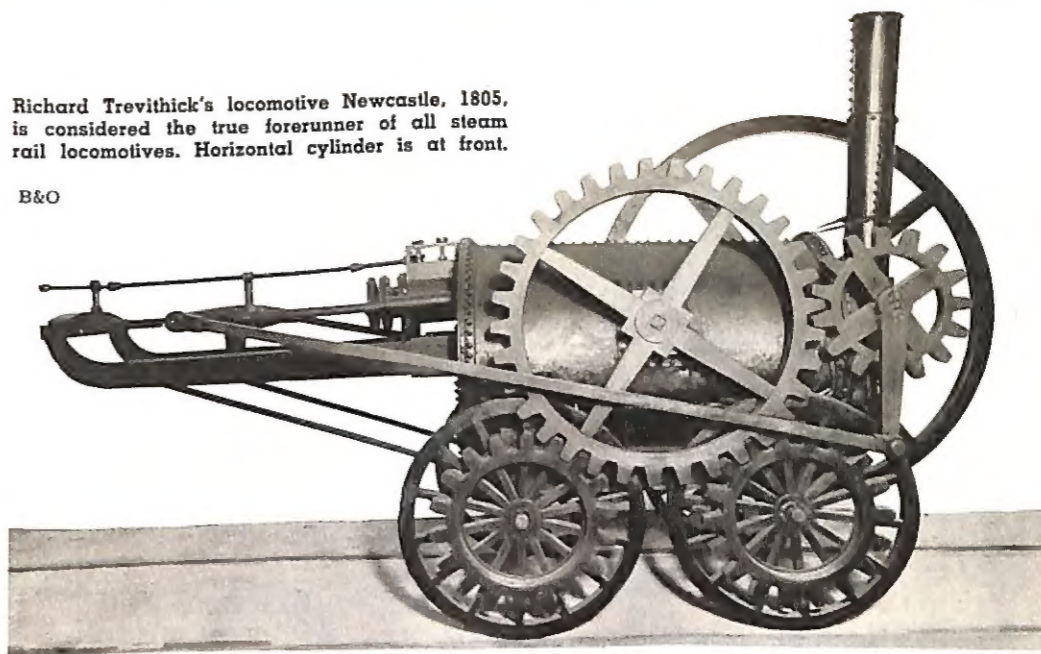
Strangely, Watt strongly opposed any application of his steam engine to road vehicles. In fact, one of his pupils and his

design assistant, a Cornishman named William Murdock, secretly in 1784 built a small three-wheeled road locomotive. Late one night on the outskirts of Redruth, Cornwall, near the southern tip of England, Murdock hand rolled his road steamer to a selected location for a trial. He purposefully had chosen a dark night for he knew that the appearance of a horseless carriage on the streets of Redruth would be as sensational as a reenactment of Lady Godiva's naked ride through Coventry. When he was certain that he had no gallery, Murdock touched off the light under the square boiler. Soon the engine started to hiss and as the steam gained pressure, the three wheeler wheezed into motion. The tiny machine had a tiller bar forward and barely enough space for a driver. Before Murdock could climb aboard his locomotive had picked up too much momentum.

What was to become the first race ever engaged in by a steam locomotive then took place. Murdock's hissing vehicle with flames trailing from the firebox soon outdistanced its inventor and highballed its way into the town of Redruth, passing on its unpiloted route a local church. When Murdock finally panted his weary legged way to this location, he spotted the Redruth vicar with eyes distended and hands trembling in terror. The vicar falteringly warned Murdock that the Devil himself had just hissed his fiery way through the village streets. The free-lancing locomotive caused no lasting damage as it ran out of pressure in front of a local ironmonger's establishment.

Watt, however, learned of Murdock's

Richard Trevithick's locomotive Newcastle, 1805, is considered the true forerunner of all steam rail locomotives. Horizontal cylinder is at front.



nocturnal experiment. He told the young designer either to drop the idea of steam as a means of locomotion or to find himself another master. Curiously enough, Watt later claimed to have been the designer of that Murdock steam engine, which was to become a museum piece.

There were numerous other inventors who experimented with steam as a means of locomotion. William Symington in 1786 patented a ratchet-driven steam road carriage as well as a marine steam engine which was later used in the first successful steamboat, *The Charlotte Dundas*, operated on the Forth and Clyde Canal, Scotland, in 1802. *The Charlotte Dundas* was the basis for both Robert Fulton's *Clermont* of 1807 and Fulton's earlier steam paddle boat which he demonstrated successfully on the Seine River in France in 1803.

Robert Fourness at Halifax in central England in 1788 built a steam vehicle, a three wheeled affair with a globe shaped boiler at the rear. Fourness, however, died shortly after the first successful operation of his vehicle.

By the beginning of the nineteenth century, the idea of steam locomotion was no longer new, but it was undeveloped and a constant challenge to the imaginative inventors of that era.

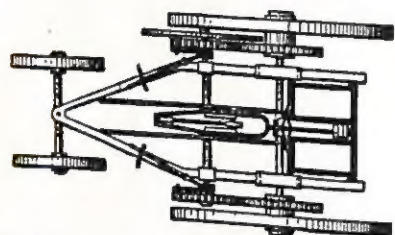
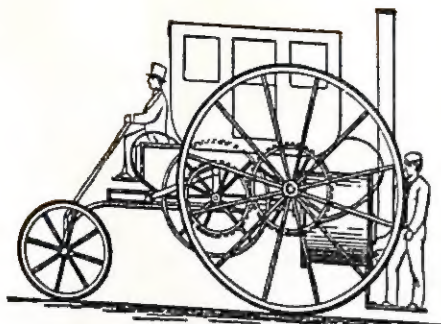
TREVITHICK—FATHER OF RAILROADING

The real pioneer to combine wheels and steam with rails and thus gain the undisputed title of Father of Railroading was another Britisher, also from Cornwall, Richard Trevithick. Trevithick was born in

1771. His father was a mining engineer, practicing his profession in Cornwall. Trevithick's first inventions were in mining. Before he was twenty-one years old, he served as a slag boy, miner, fireman and steam engineer at Newcastle in the north of England. He perfected an improved steam pump used in flooded areas of the coal mines. Then he created an improved high pressure steam engine.

In 1797 Trevithick began his first experimentation in the steam locomotion field with a three-wheeled, single vertical cylinder road machine. Nearly all of the early road steam experiments incorporated a three-wheeled design. The reason for this was quite simply one of steering ease. A tiller attached to the end of a shaft, in turn attached to the wheel, offered the simplest and easiest method to turn a vehicle. With the clumsy weight balance of early steam engines, turning a road vehicle would have been impossible if the conventional carriage type of steering, an axle mounted in the center on a king pin, had been used. Since before 1800 no one conceived of letting the rails steer, the three wheeler experimental vehicle invariably got the nod.

Trevithick's second experimental machine, known as the Trevithick-Vivian of 1801, was a four wheeler but it could only be run straight ahead as no means of steering was provided. This machine came to an untimely end on Christmas Eve of 1801 but curiously enough, not because of the inability of Trevithick and his cousin-partner to steer. They had finished a successful test run, the second for the machine, and had stopped at a pub to celebrate. The engine of



The first vehicle specifically designed to carry paying passengers and the first to make 10 mph was William Trevithick's Steam Carriage, 1801.

Oldtime Steam Cars

the 1801 model was mounted on an all-wooden frame. Trevithick and his partner left the tavern in a gay mood and found to their dismay the engine recumbent on the ground surrounded by charred remnants of the frame and wheels.

Trevithick's third attempt, like the second in collaboration with Vivian, was made in 1803. This, too, was a four wheeler designed for road use and during its London test reportedly reached eight miles an hour.

Various early reports on Trevithick and other inventors of steam coaches are rife with conflicting dates and conflicting data. Since photography was not to be developed until after 1825, and not to come into general use until after the first half of the nineteenth century, isolated reports based on observation by eye witnesses of early demonstrations are the most factual sources available.

Some historians claim that passengers were transported by Trevithick's road locomotives as early as 1801. Whether this is so is of really no great importance to a history of railroads since it was not until 1805 that Trevithick built his first rail operating steam locomotive. This model is referred to variously as the Trevithick Newcastle steam engine or the Gateshead locomotive. But the important point is that the wheels of the 1805 model were flanged on the inside and the tests were actually conducted over a strap rail road supported by wooden stringers. Thus in 1805 the pioneer steam railroad came into being.

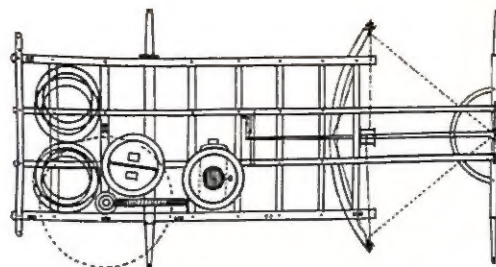
France, with Cugnot's invention, had had the jump on the rest of the world but failed to take advantage of her opportunity. That inventors of that country did not follow through too rapidly on the heels of Cugnot's initial attempt with similar or improved steam devices is understandable, for following the first successful demonstration, which wound up in disaster when Cugnot's brakeless behemoth plunged into and destroyed a solid masonry wall at the Paris arsenal where the rig had been built, the hapless inventor was courtmartialed and tossed in the local brig. His military superiors and the key civilian officials of Paris viewed Cugnot's experiments with distaste.



Oliver Evans, Philadelphia blacksmith, repairman, boat builder, and inventor, built a locomotive in 1804 that traveled on land and water successfully.

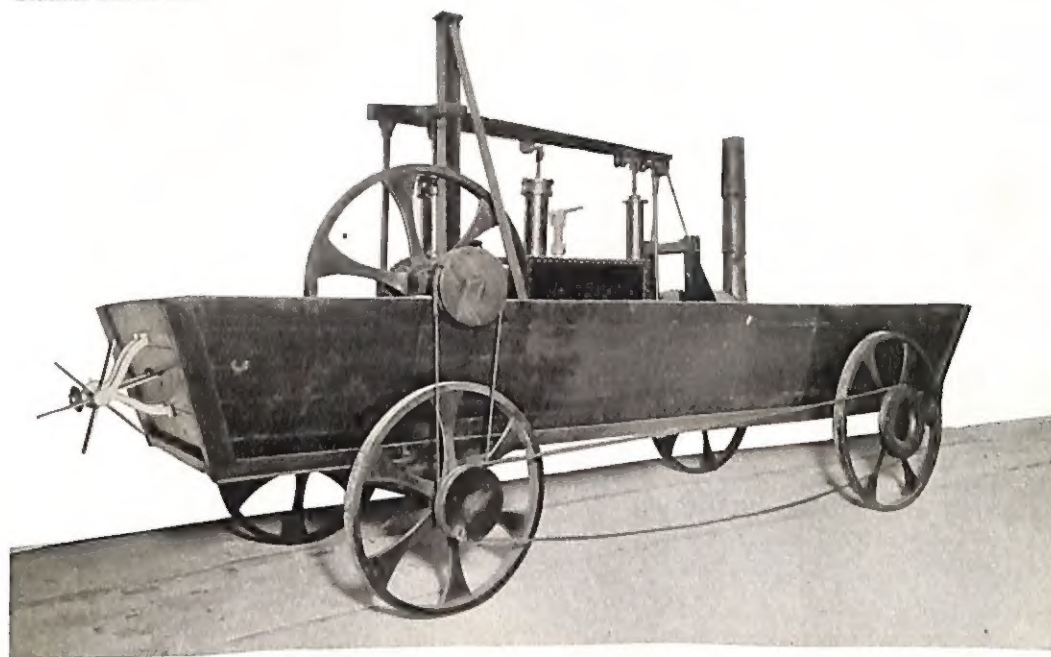
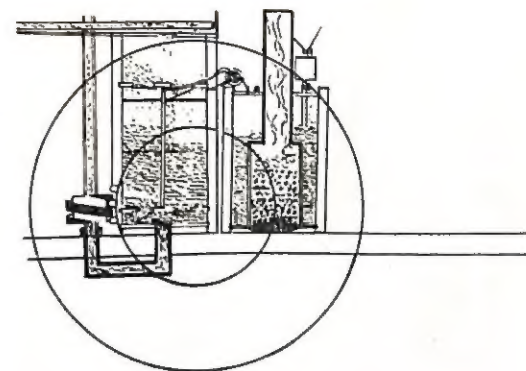
AMERICA'S FIRST LOCOMOTIVE

American inventors, too, were intrigued by the idea of horseless transportation. Oliver Evans, a Philadelphia blacksmith, steam engine repairman and boat builder, was an enthusiastic believer in high pressure steam and as early as 1780 had built a multi-tubular, boiler type stationary steam engine that functioned satisfactorily. In 1804 he built one of the most ambitious steam powered transportation devices created to that date. Under contract to build a dredge, Evans not only added a steam engine to operate the dredging mechanism but also, through a complicated series of drives, rigged his barge with a steam moticart wheels so that it was in actuality the world's first self-propelled amphibious craft. Known as the *Eructor Amphibilos*,



Steam wagon design was drawn up by Oliver Evans in 1801. Road wheel was geared to a vertical drive shaft, run by a horizontal 5-ft. flywheel.

Oldtime Steam Cars



The steam boat had already been successfully tried in America 20 years before Evans' *Eructor Amphibilos*, but this ingenious scow was the first motor-powered vehicle to run on land on this side of the Atlantic.

B&O

Evans' creaking steam-wagon-barge suffered total wheel collapse on its first trip. With more rugged axles and wheels fitted to it, it rolled over the rutted city streets of the day to its launching point on Philadelphia's Schuylkill River and America's first locomotive had been tried with success.

Evans was considered more than somewhat daft when he stated, "The time will come when carriages propelled by steam will be in general use, traveling at the rate of fifteen to twenty miles an hour, or 300 miles a day, as fast as birds can fly, passing through the air with such velocity as to be a most exhilarating exercise. To accomplish this two sets of railways will be laid, so nearly level as not to deviate more than 2° from horizontal, made of wood or iron, on a smooth path of broken stone or gravel

to guide the carriages so they may pass each other in opposite directions as they will travel by night as well as by day. Passengers will sleep in these stages as comfortably as they do now at stage coach inns."

This later-day Nostradamus went on to say, "Twenty miles per hour is about thirty-two feet a second and the resistance of the air about one pound a square foot; but the body of the carriages will be shaped like a swift swimming fish to pass easily through the air. The United States will be the first nation to make the discovery, and her wealth and power will rise to unparalleled heights."

Most persons who heard or read Evans' statements were sure that he had blown a piston.



Animal power preceded steam on inclined railways in America by nearly 30 years. Mules pulled cars up this gravity line; then rode cars back down. B&O

TRAVEL ON RAILS

The idea of the use of rails was not generally known in America in 1800 although as early as 1764 British troops under Captain John Montross built an inclined railway at a military encampment at Lewistown, New York. This cable operated railway was used to transport supplies from a Niagara portage and the lower Niagara River to the top of a 300-foot bluff. The rails were constructed of deeply grooved logs. The tramway itself was double tracked. A rope extended from one car to the top of the bluff, wrapped around a large drum and then passed down the hill again where it was connected to another car on the parallel track. By keeping the loads fairly evenly balanced one car could be lowered down the incline while the other was being raised with little physical exertion being required on the windlass connected to the drum.

The first American-built road of rails was a short, inclined track of wood used as early as 1800, when John S. Copley, then a prominent New England artist, sold his Beacon Hill, Boston, Massachusetts, plot of ground and the new buyers wished to level six feet off the top of the hill for fill purposes. A gravity, cable operated tramway was used to shift the earth.

In 1807 Silas Whitney added a second inclined railway track to Boston's Beacon Hill and used this for the transportation of brick and other kiln products. Thomas Lieper, snuff merchant and industrialist of Philadelphia in 1809 had John Thompson build for him a three-quarter mile long railroad to connect his quarries at Crum Creek with a boat landing at Ridley Creek. The rails and cross ties were constructed of white oak and the cars that operated on the Lieper railroad were equipped with flanged, cast iron wheels. This stone haul-

ing freight road was used successfully until 1828 when it was replaced by a canal.

Other early American locomotiveless railways included a short stretch south of Richmond, Virginia, along Falling Creek where in 1811 the then-new style road bed was installed to give transportation to a powder mill. Northeast of Pittsburgh, Pennsylvania, in 1818 another short stretch of railway was installed for freight transportation of the Bear Creek Furnace. Another wooden stretch, also using animal power, was built in 1825 at Nashua, New Hampshire.

THE GRANITE RAILWAY

Best known of the early primitive wooden railways was Gridley Bryant's Granite Railway built at Charlestown, Massachusetts, to transport granite used to build the Bunker Hill Monument. It was a combination gravity and animal power road. Horses were used to pull the cars up hill and rode in the cars on the downhill run, so in essence the Granite Railway was also the first American road to carry live-stock.

The road itself was three miles long, running from the Quincy quarry to the Neponset River. Twelve-inch-square by eight-foot-long stone ties were topped by twelve-foot by six-inch-square pine timbers, with a two-inch by four-inch oak facing on top. This in turn was capped by strap iron three inches wide by five-sixteenths thick. The line was a double track, of five-foot gauge, and had turntables at either end. Four cars made up the rolling stock. One sound horse was able to pull a gross load in excess of thirty tons at the rate of four and a half miles per hour over the line. The railway was built at a cost of \$33,750, but despite this expenditure, it reduced quarry transportation costs to one-sixth.

So great was the novelty of the Quincy to Neponset railway that a tavern was erected just off its right of way and prospered with sight-seeing business. Daniel Webster is reported to have made a stop wonder. The line was eventually taken over by the Old Colony Railroad which today is part of the New York, New Haven and Hartford Railroad.

Another less desired "railway first" also occurred on the Granite Railway when in 1832 a runaway car with four passengers went over a cliff and American railroads suffered their first fatal accident.

ENGLISH DEVELOPMENTS

Though America had its interest in railroads during the first quarter of the nine-

teenth century, it was in England that steam railroads originally came into general practical usage. George Stephenson, born near Newcastle, England, in 1781, was ten years younger than Great Britain's pioneer of railroads, Richard Trevithick. But like Trevithick, by the time Stephenson was twenty-one he was long past his apprenticeship with stationary steam apparatus. He had worked as a colliery fireman, brakeman and engine man. By 1812 Stephenson was building stationary steam engines but at the same time had carefully studied Trevithick's application of steam power to locomotives. In 1814 Stephenson constructed a locomotive which successfully operated a colliery tramway, draw-

ing eight loaded cars at four miles an hour.

The English with their need for coal mine transportation brought forth a score of early locomotive railroad developers. In 1812 William Hedley paved the way for this development with his manual power flanged wheel car. With this hand operated engine, Hedley was able to demonstrate that adhesion between the smooth metal of iron wheels and iron rails could be employed on a locomotive driving wheels to haul heavy loads. Hedley's demonstration was of great importance to future developments for it permitted designers to dispense with rack rail or cog rail drive popularly accepted as a necessity at that time.

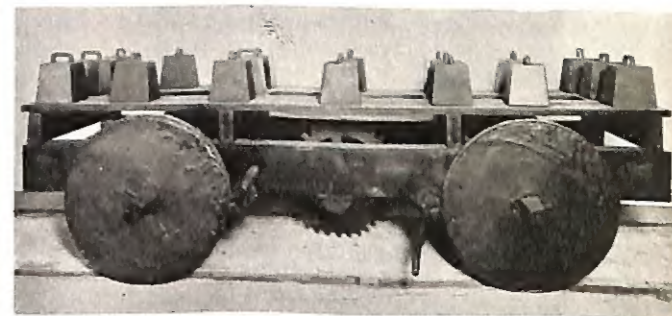
The following year, Hedley, assisted by

B&O photos

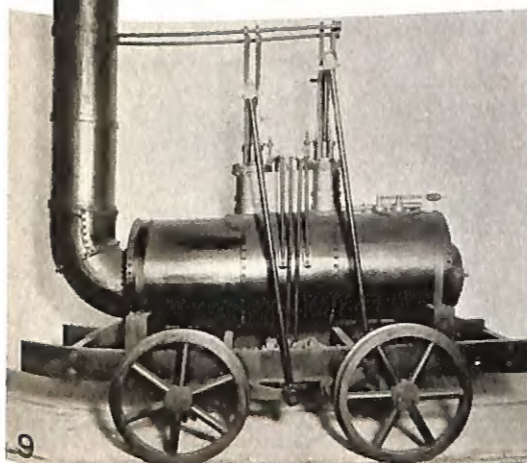


At left is a wooden model of John Blenkinsopp's vertical-cylindrical 1812 locomotive, typical of the rack rail types propelled by cog wheels.

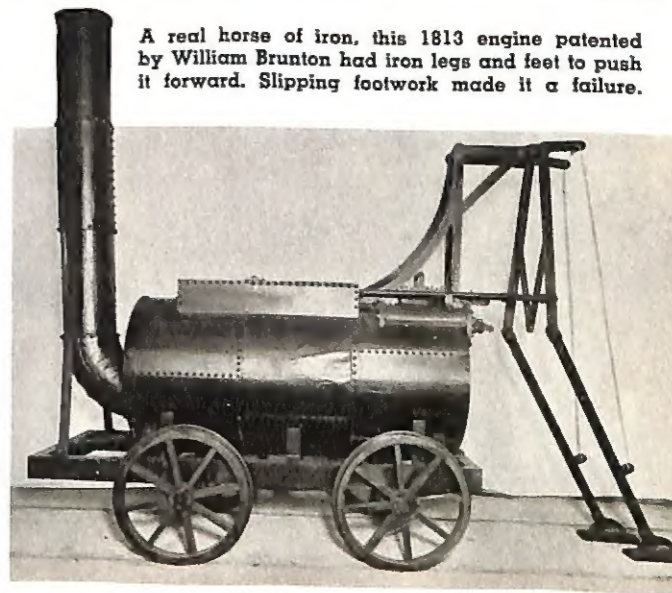
William Hedley's manually powered 1812 locomotive, below, proved the rack rail unnecessary, that smooth wheels had adhesion to haul heavy loads.

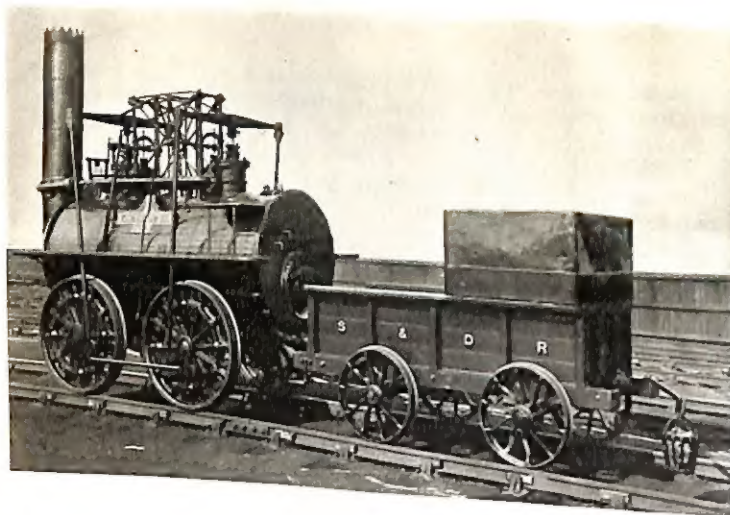


Blucher, 1814 George Stephenson locomotive had 8-ft. horizontal boiler and flangeless wheels to run on angle rails.



A real horse of iron, this 1813 engine patented by William Brunton had iron legs and feet to push it forward. Slipping footwork made it a failure.





NY Central

Locomotion, built in 1825 by George Stephenson, for Stockton and Darlington RR. could pull 29 cars and a tender at a startling 8 mph.

Timothy Hackworth, constructed a locomotive for the Wylam Colliery which incorporated a horizontal tubular boiler with two vertical cylinders located on either side of the boiler at the rear. The pistons were connected by vertical beams to a pair of seesaw action beams which drove a crankshaft geared to two forward driving wheels. Stephenson's 1814 model was called the *Blucher*. Its wheels were smooth treaded since the tracks at the Killingworth Colliery for which it was designed had angle

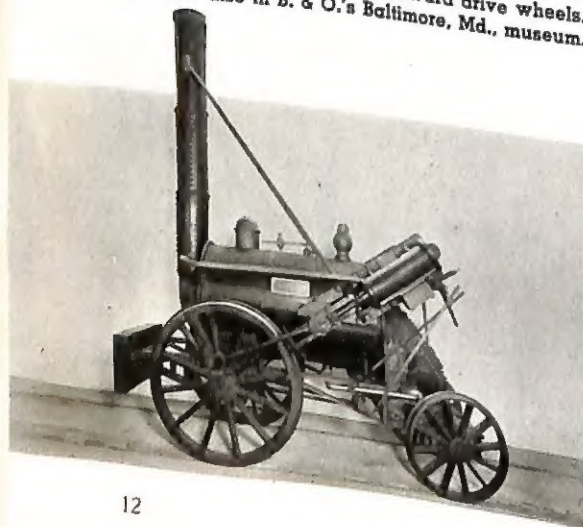
shaped rails, like Ls, to fit wheel grooves. In 1815 Stephenson adapted steam blast, which permitted him immediately to double the speed of his locomotive without losing pulling power. Stephenson at this time had plans for a thirty mile an hour heavily loaded locomotive.

The Stockton and Darlington railroad in northern England connecting the Tees River with the North Sea was already functioning as a horsedrawn line. Stephenson, through a surprising foresightedness

B&O photos

Englishmen William Hedley and Timothy Hackworth collaborated to design Puffing Billy in 1813. Model shown is in B. & O. Transportation Museum.

Rocket, winner of the Rainhill trials, pulled a 14-ton load at 29 mph. Note forward drive wheels. Model is also in B. & O.'s Baltimore, Md., museum.



by the line's officers, was appointed Chief Engineer. In 1821 through Stephenson's influence, the Stockton and Darlington Railway Act was passed. This act provided for traffic of wagons and other types of carriages on the line with the clause inserted, "with men or horses or otherwise." It was these last two all-important words which permitted Stephenson to persuade the company officers to allow steam locomotives to haul passengers on the line. September 26, 1825, was an important date to railroad history, for on that day Stephenson's steam locomotive *Locomotion* made a non-publicized trial trip with one coach. Stephenson's older brother, James, handled the controls of the engine while George, confident that his locomotive needed no special treatment, rode in the coach behind.

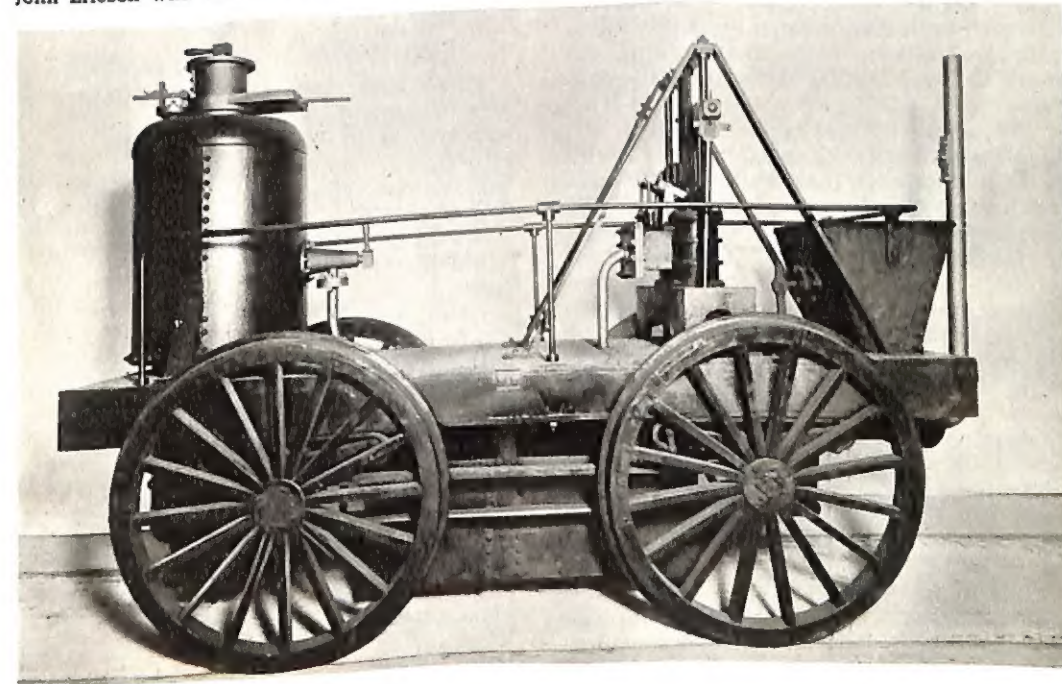
The following day a formal opening was scheduled. This time George served as engineer and the *Locomotion* with a load of twenty-nine cars plus a tender loaded with water and coal averaged eight miles an hour. Six cars were loaded with coal with an overflow of curious passengers riding on top. Another railway wagon contained flour barrels. Still another was loaded with the company's line surveyors and engineers. A single passenger coach carried the nervous directors and officers of the daring young railroad. Six other colliery cars were

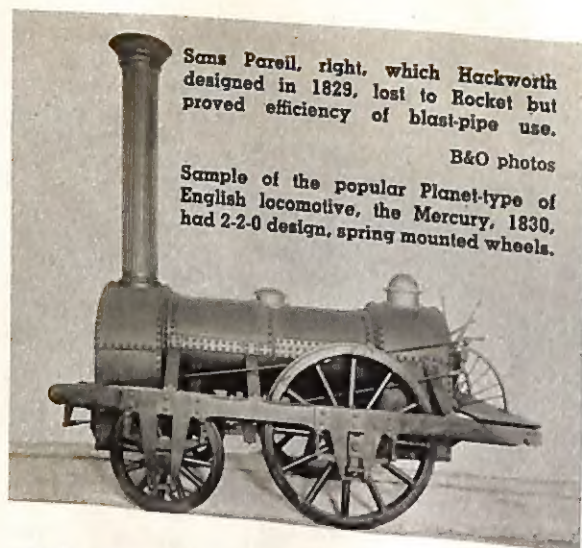
filled with total strangers while the remaining fourteen cars were taken up by workmen. The overall load was nearly ninety tons. Couplings were primitive and frequent derailings occurred during the test until Stephenson hit upon the idea of lashing fencing-rail buffers between each car to cushion the shock of impact.

The short line railway right of way was jammed with curious and skeptical on-lookers, most of whom lost their prejudices on first viewing the little iron horse. Horses snorted with fright as *Locomotion* puffed its way through the countryside. When the accomplishment of *Locomotion* was compared to the Surrey Iron Railway between Wansworth and Croydon on which a team of horses regularly drew fifty-five ton loads over the six-mile distance in two hours, the performance of Stephenson's train was even more striking.

Stephenson's influence was to continue to increase and to have a tremendous impact on future railroad development in America. He was employed to supervise the construction of England's Liverpool and Manchester Railway. When the line was completed, with overwhelming difficulties encountered in laying track over a swamp area in Chat Moss, Stephenson persuaded the company to offer a prize of \$2,500 for the locomotive that could run ten miles an hour pulling three times its

John Ericson who worked on Novelty, below, later designed the famous Monitor, iron ship of Civil War.





Sans Pareil, right, which Hackworth designed in 1829, lost to Rocket but proved efficiency of blast-pipe use.

B&O photos

Sample of the popular Planet-type of English locomotive, the Mercury, 1830, had 2-2-0 design, spring mounted wheels.



weight. Known in railway history as the Rainhill Trials of 1829, this locomotive contest was eagerly watched in the United States as well as in England and on the Continent where French and German designers were also viewing railway transportation with excited interest. Stephenson entered the contest with his soon-to-be famous *Rocket*, a locomotive that weighed approximately four tons, towing a tender of slightly over three tons.

Stephenson's principal rival was the entry of the firm of Braithwaite & Ericsson, the *Novelty*. This was a two-and-a-half-ton locomotive which drew a nine-ton load at nearly twenty-one miles an hour. Unfortunately, *Novelty* broke down during the trials and was unable to complete the contest.

The *Rocket* on the second and final day of the trials reached a speed of twenty-nine and a half miles an hour pulling a fourteen-ton load to win the award.

Almost immediately, however, after Stephenson's sensational demonstration, violent boosters and detractors of new steam transportation came into being. Oliver H. Smith, a United States Senator from Indiana, immediately foresaw the advantages to be gained by general adoption of steam railroads as transportation in the States. In a joint session of Congress in 1826 Smith stated, "I tell you that in England they have already run railroads fully loaded at thirty miles per hour and they will yet be run at higher speeds in America."

An unknown opponent rose to his feet and shouted, "Either you are crazy or you think we are fools for a man could not live at that speed!"

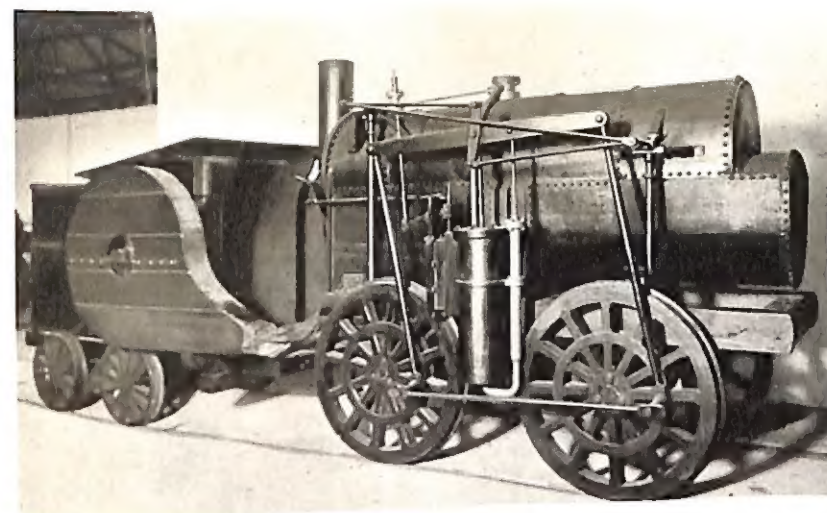
Almost simultaneously with the performance of the *Rocket* and the *Novelty* came the published statement in a book issued by a Boston firm, "The ridiculous expectations, or rather professions, of the enthusiastic speculator who predicts twelve, sixteen, eighteen or twenty miles an hour can do great harm toward public acceptance of railroads as such talk is sheer nonsense."

But such talk was not sheer nonsense. And in America as well as in England, railroads despite opposition had passed the experimental stage and were moving forward toward a period of rapid development.

JOHN STEVENS—RAIL PROPHET

Since 1810 John Stevens of Hoboken, New Jersey, had been loudly and constantly preaching the cause of railway construction for long-distance transportation. Stevens had both an inventive and a courageous spirit. Just after the turn of the nineteenth century he developed and patented his own design for a multi-tubular boiler for a steam engine. As early as 1811 he petitioned the New Jersey State Legislature for a railroad charter, but his application was refused. He sought an audience with New York State Erie Canal commissioners and tried to persuade them to look into his crystal ball and foresee the advantages of railway over the projected canal to join Lake Erie at Buffalo with Albany.

Stevens was turned down. He was able to persuade a young New York legislator, Henry Migs, that he, Colonel John Stevens, and Oliver Evans, had a foresight that the canal planners lacked. At his own expense in 1812, Stevens published a pamphlet titled, "Documents Tending To Prove The



B&O

A belt driven fan mounted on the tender of this 1827 French locomotive by Seguin provided forced draft. The engine used first multitubular boiler.

Superior Advantages of Railways And Steam Carriages Over Canal Navigation." Migs was an eager disciple of Stevens and quoted Stevens' pamphlet all too frequently, for his support of Stevens' ideas led to the quick end of his promising political career. Finally Gouverneur Morris of New York State and Chancellor Livingston, reflecting the sentiment of the times, rejected Stevens' pleas, stating categorically, "A railroad under any circumstance is impossible."

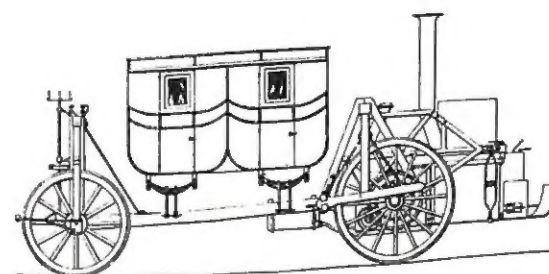
Both in America and in England during the pioneering stages, the wealthy and the powerful who had the means to help were almost invariably railroads' most outspoken enemies. One wealthy Englishman stated just after the opening of England's Liverpool to Manchester line that railroads were trying to do away with horses and were trying to do away with horses and drivers and their earning capacity of \$500,000,000 a year. This was strong railroad poison and of course the argument wholly overlooked the fact that people would be employed on the railroads re-

gardless of whether they were horse or locomotive operated.

One major canal corporation in America enlisted the service of a then highly respected scientist who toured major eastern cities, attending any open forums on railroad discussions, and purportedly proving scientifically that the swiftness of railroad journeys would addle the brains of the passengers.

Yet Stevens did not go down to defeat without a staunch fight. He finally persuaded a new session of the New Jersey Legislature to grant to him a charter for a railroad and in 1815 Stevens obtained the first railroad charter ever to be granted in the new world. This steam road was planned to join the Delaware and Raritan Rivers, offering a combination steamboat-railroad route from Philadelphia to New York. But lack of funds and lack of public confidence as a means of obtaining outside credit and cash caused the Delaware and Raritan Railroad to become nothing more than a historical bit of legal paper. •

Contemporary inventors kept trying to harness steam to the familiar stagecoach design. This picturesque 1822 production had boiler trouble.



Oldtime Steam Cars

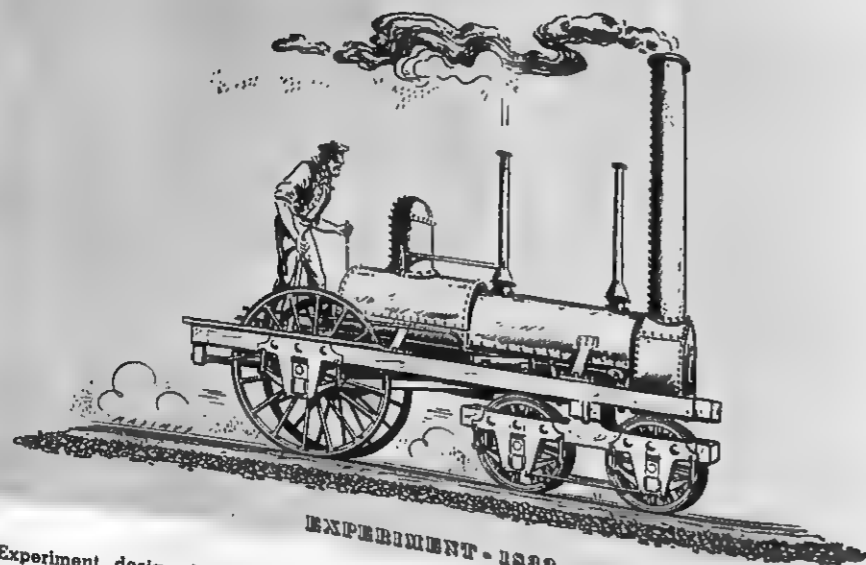
Entries in the famous Rainhill Trials of 1829 were not limited to steam locomotives. Single horsepower treadmill was Brandreth's Cycloped.



STEAM POWER TAKES OVER



 **RUNNING OVER WOODEN RAILS ON TIES OF STONE, THE LOCOMOTIVE
BEGINS TO CHALLENGE CANAL AND STAGECOACH TRANSPORTATION**



EXPERIMENT - 1832

The Experiment, designed by John B. Jervis, was the fastest locomotive in the world in 1832. Built at the West Point Foundry for the Mohawk & Hudson Railroad, it could cover 14 miles of track in 13 minutes, and was once timed at 80 miles an hour over a one mile stretch by its operating engineer.

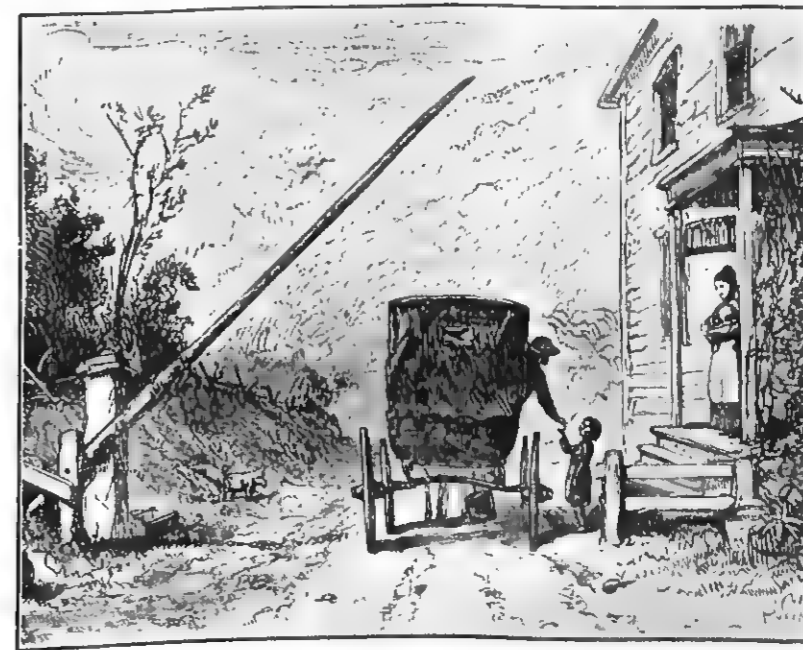
NY Central

TRANSPORTATION at the turn of the nineteenth century in the United States was inadequate, uncomfortable, slow, and often dangerous. Commerce was hindered by prohibitively high freightage costs.

In 1756, covered wagons took three days to travel from New York to Philadelphia. Travel in the Midwest was even more difficult until a treaty with Spain in 1795 gave the western settlers freedom to use the Mississippi River. Farmers pooled their produce, built flat boats, and let the Ohio and Mississippi's treacherous currents carry them down river. If an intervening upset did not rob them of a year's labor, the produce was marketed and their flatboats sold as scrap lumber at New Orleans. The Blue Ridge barrier and the Cumberland Mountains cut off trade with the Atlantic seaboard states. The only alternative, that of ferrying produce to New Orleans and the return trip by horseback, called for a rugged and frequently perilous three months' journey.

At the turn of the century, farmers in upper New York State paid nearly 25 cents a bushel to ship their wheat to New York City. Produce from Pittsburgh took three months to reach New Orleans, its most readily accessible market. Wagon shipment across the mountains to the coast was too costly to warrant consideration. The Federal government recognized the need for better transportation facilities if the western territories were to be more thickly settled and to prosper.

In 1811 the National Turnpike, much of which today is U. S. Highway Route 40, was started with Federal help. By that time four



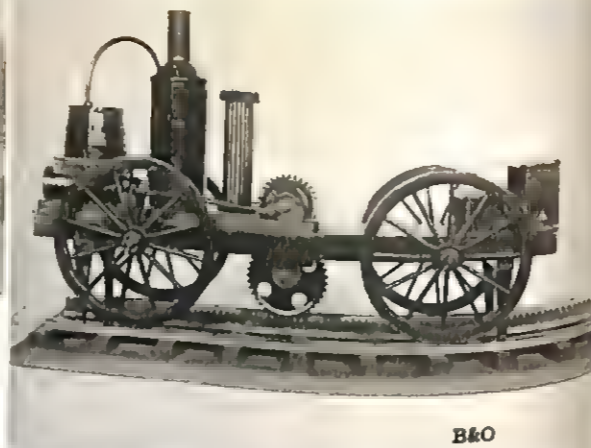
The National Turnpike was built to connect the principal cities in the east with the Ohio River. Opened to the public in 1818, the road had toll gates every 15 to 20 miles. Road conditions were rugged even in dry weather, and carriages, stage coaches, and big Conestoga wagons took days to roll over the ruts between cities.



NY Central

Packet boats were slow but offered fine food and accommodations. Scene above is of Erie Canal, 1820.

First locomotive built in America was John Stevens' experimental model. Vertical posts guided trucks.



B&O

called in China. This 1,000-mile long engineering feat, which in some places made use of viaducts twenty feet higher than the surrounding countryside, patterned inland water transportation for the rest of the world.

In the United States as early as 1762, the Middletown and Reading, Pennsylvania, Canal was in operation and by 1794 a canal had been cut through the Dismal Swamp to connect the Chesapeake Bay with Albermarle Sound. But not until the Middlesex Canal from Boston to Lowell, a thirty-one-mile long, four-foot deep ditch, was completed in 1804 did the packet boat type canal travel in the United States really get under way. From that time until nearly 1850 canal projects proved commercially feasible and relieved somewhat the throttling aspect which meager transportation had on United States business.

The most ambitious and best known of the early American canals was the Erie, completed in 1825. Stretching from Albany on New York's Hudson River to Buffalo on Lake Erie, this 352-mile, \$7,143,800 big ditch gave a four-mile-an-hour freight and passenger service that was leisurely but relatively cheap and dependable. Yet to the few progressive, mechanically minded individuals who had studied the progress of steam in England in stepping up the speed of transportation and who had watched with interest John Fitch's and Robert Fulton's steamboat experiments and later the wheel auxiliary sail-rigged steamer, *Savannah*, the turtle-paced canal traffic seemed ridiculously retarded.

STEVENS' PENNSYLVANIA RAILROAD

John Stevens, who had been disappointed in being unable to raise funds to build a railroad from Trenton to New Brunswick, New Jersey, after inducing the New Jersey legislature to grant him a char-

Library—Stevens Inst.

First locomotive in America to be driven along a track by steam was Stevens' 1825 invention. It was run on the rack-railed oval track at his home in Hoboken, N. J.



ter, refused to admit defeat and persuaded the legislature of Pennsylvania to pass an act authorizing the construction of an 80-mile stretch of steam-powered railroad from Philadelphia to Columbia, Pennsylvania. This charter, granted March 21, 1823, was the second American railroad charter to be issued. Stevens visualized his road eventually extending to Pittsburgh, through Ohio, and on to the Great Lakes. In his notes he wrote, "The improvement, when once introduced, will unquestionably be extended from Philadelphia across New Jersey to the City of New York."

Stevens' charter and his incorporation of the company under the name of the Pennsylvania Railroad technically establishes the Pennsylvania, which later took over this rail route, as the oldest chartered United States railroad still in existence. However, the Pennsylvania Railroad was not the first on which a steam locomotive operated, nor the first railway common carrier to conduct a regular scheduled business.

Stevens, as before, was doomed to be disappointed, for after futilely spending several years trying to raise funds to finance the road or to persuade politicians to grant state support for the project, neither private money in any impressive amount nor state funds were available. The public still had little faith in the unseen and untried steam locomotive.

When on March 27, 1824, Pennsylvania appointed a Board of Commissioners to promote the construction of a canal from Philadelphia to Pittsburgh, Stevens decided he must provide more substantial proof that the steam locomotive could actually function properly. He returned to his home in Hoboken, New Jersey, and went to work on an experimental locomotive.

On October 23, 1824, Stevens' experimental job rolled into action on a circular, 220-foot track laid out at his estate. The

engine was a vertical, tubular boiler type enclosed in a circular sheet iron casing, topped by a conical hood which held the furnace door and on which rested the smokestack. The furnace and grate were circular, enclosed by the boiler tubes. A single horizontal cylinder with a valve chest on top was mounted beside the boiler and transmitted its power to a crankshaft on which a geared wheel was mounted. This gear engaged a second and larger gear positioned vertically below it which in turn meshed into a rack rail located between the running rails. Four posts extended downward from the floor of the frame, supporting the engine and each of these posts terminated in rollers which contacted the inner face of the rails and guided the four-wheeled, one-thousand-pound job around the circular track. It was able to maintain a speed of twelve miles an hour with six passengers.

Stevens' locomotive was the first in America to be driven by steam upon a track. Although Stevens failed to raise funds to put his Pennsylvania Railroad into operation, he did infect a nucleus of loyal followers with the railroad fever. Forty-eight rail advocates chipped in \$100 each to provide a promotional fund to launch a campaign "of education which would eradicate from the public mind the obsession that the canal was the only practical method of transportation." This group was called the Society for Internal Improvement.

Philadelphia at this time was the most important seaport and the largest city in the United States. The Pennsylvania Board of Canal Commissioners were not unaware of the great advantages the opening of the Erie Canal offered New York. They sent an engineer, William Strickland, to England to make a study and prepare a report on the general subject of transportation with specific stress on canals and



Horatio Allen, engineer of the Stourbridge Lion, was a railroad pioneer who later worked on South Carolina Canal & RR Co.; was president of Erie.

Southern

Horses soon began to lose their place in front of the railroad car. Vertical-boilered locomotive here is being serviced at watering and fuel depot. B&O

railways. It is to their credit that they recognized that the developing friction between partisans of canals and railways would have an injurious influence on the state's welfare. Though appointed as Canal Commissioners, they stressed that Strickland should present an impartial report on both media.

Strickland, upon his return, recommended that the selection between canal and railway should be governed by topography. He suggested that canals be used for level stretches and railways be laid through the rolling country. Strickland was appointed engineer by the state and charged with making the necessary surveys and given authority to recommend which section should be covered by canals and which by railroads.

On March 24, 1828, political sentiment had changed to such an extent that the state appropriated \$2,000,000 to begin construction of the Philadelphia and Columbia Railroad, with work to start simultaneously from both ends of the projected line.

By December 1829, nearly forty miles of the roadbed and rail laying had been completed, including necessary bridges, culverts, viaducts and the strap iron rails laid on stone blocks. As early as October 1829, horse-drawn cars were tried out on the completed sections.

EARLY LOCOMOTIVES

The Delaware and Hudson Canal Company, owner and operator of coal mines at Carbondale, Pennsylvania, used a series of eight inclined gravity railroads to link its canal section with Honesdale, Pennsylvania. Delaware and Hudson's chief engi-

neer, John Bloomfield Jervis, had followed with interest the struggle between rail and canal factions in Pennsylvania. He had been impressed by Stevens' experimental locomotive and sent his assistant, Horatio B. Allen, to England to buy four locomotives and a stock of rails.

The first of the locomotives was landed in New York City on January 15, 1829. It was called *America*, a product of Stephenson & Company, Newcastle, England. Assembly was undertaken at The West Point Foundry, Beach Street, New York City. On May 17, the second of Allen's purchases arrived, the *Stourbridge Lion*, a four-coupled-wheel locomotive designed along the lines of Hedley and Hackworth's famous British *Puffing Billy*. This locomotive, too, was assembled at The West Point Foundry and for a time with its wheels jacked, it was demonstrated to curious spectators at a one shilling admission fee. In early July it was turned over to the Canal company along with the *America* and was transported by boat up the Hudson to Roundout, then by canal to Honesdale.

The two locomotives, including customs costs and shipment, ran to about \$6,500. The *America* retailed for \$2,581; the *Lion*, \$2,190.63. The balance of the expense represented loading costs, transportation, and nearly a thirty per cent custom fee.

What happened to *America* after it was unloaded is one of railroading's unsolved mysteries. A cylinder, presumed to be one from the *America*, has found its way to the Smithsonian Institution at Washington, D. C., but no data exists concerning the engine's use and eventual disintegration.

What happened to the *Stourbridge Lion*,

with its gaily painted red and gold lion's head on the front of the boiler, was more eventful but tinged with tragedy.

It had been estimated that the *Lion* would weigh three tons. Instead it weighed closer to seven tons. The locomotive had a horizontal boiler, two thirty-six-inch stroke vertical cylinders, with grasshopper type walking beams communicating motion to the oak, iron-tired, driving wheels.

On Saturday, August 8, 1829, the Delaware and Hudson prepared to give the *Stourbridge Lion* its initial test. During Allen's trip to England when he had bought the *Lion*, *Delaware* and the *Hudson* from Foster, Rastrick & Company of Stourbridge, John Jervis had had the roadbed for the new steam locomotives laid on the banks of the Lackawaxen Creek. By the time the test was ready, the hemlock rails had warped. A thirty-foot high wooden trestle crossed the Lackawaxen three hundred feet from the beginning of the road, designed with three tons in mind. It seemed flimsy in view of the *Lion's* seven-ton weight. Beyond the trestle was a three-hundred-and-fifty-foot radius curve, followed by a two-and-a-half-mile straight stretch. Doubts were expressed that the *Lion* could cross the trestle without collapsing the rickety framework. Even if the seven-ton steam monster could clear the bridge, the skeptics were certain that it could never navigate the sharp radius curve. Allen, however, refused to be frightened and volunteered to helm the big cat.

A cannon had been borrowed to inaugurate the run. As the *Lion* stood hissing and poised with Horatio Allen at the throttle, Alva Adams jerked the cannon lanyard.

B&O

Atlantic was one of B. & O.'s seven locomotives by 1835. Here it pulls Imlay cars, named after builder.



Charles Carroll of Carrollton, venerable Revolutionary patriot, officiated with a spade at the first stone laid on B. & O.



Ellicott's Mills was linked by rail with Baltimore in 1829. This 1830 drawing shows train running along background hill.

B&O



First passenger car to make a regularly scheduled run on rails in America was this B. & O. horse car of the 1829's.

B&O



Like early English railroads and South Carolina Canal & RR, the B. & O. tried sail cars. In painting of Aeolus shown.

B&O



Painting by Stanley Arthers—B&O

Over-zealous loaders had tamped in too heavy a powder charge. The cannon disintegrated with a noisy blast of cast iron and bronze shrapnel. Adams' arm was shattered and torn off but the *Stourbridge Lion* puffed serenely away, rumbled and creaked across the swaying trestle, screeched around the curve and made a jolting two-and-a-half-mile and return trip to become the first English locomotive to run in America. But immediately after its satisfactory test, it dropped into permanent retirement as considered opinion had it that the *Lion* was just too heavy for the flimsily built roadbed. The boiler of the beast was eventually used as a stationary engine at a Carbondale, Pennsylvania, foundry, then ultimately scrapped.

The locomotives *Delaware* and *Hudson* were placed in storage at Abeel and Dunscomb's warehouse, east side New York. Whether they ever saw use is unknown but Horatio Allen, who had dared the Lackawaxen trestle, had the steam fever and he moved on to the South Carolina Canal and Railroad Company. Later he served as construction engineer and finally as sixth president of the Erie Railroad.

THE BALTIMORE AND OHIO

More than two years before the *Stourbridge Lion's* first and last run, commerce-stagnant Baltimore made its bid for western business. On February 28, 1827, the Baltimore and Ohio Railroad Company was chartered by the State of Maryland and incorporated on April 24, that same year. To the B. & O. goes the honor of being the first American railway public carrier in regular service.

There is a fine distinction here that has been the source of many needless arguments. The B. & O. was chartered nearly a year before the South Carolina Canal and Railroad Company (now a part of The Southern), which was officially granted permission to build on December 19, 1827. In 1830, the B. & O. opened scheduled daily traffic over a nearly fourteen-mile-long stretch from Baltimore to Ellicott's Mills, Maryland. But although as early as August 28, 1830, a steam locomotive was tried on the B. & O., regular steam-powered traffic did not displace horse-drawn traffic over the B. & O. until several years later. By contrast, the South Carolina Canal and Railroad Company used steam from the inception of its regularly scheduled service on December 25, 1830. The Southern's predecessor is America's first railroad to use steam power in regular service.

It is interesting to note that when these two pioneering lines were chartered in

1827, the lone school in America to offer engineering training was the United States Military Academy at West Point. That's how it happened that Army engineers conducted the B. & O.'s original surveys and planned many of its structures.

On the Fourth of July, 1828, construction started on the B. & O. Baltimore's most prominent citizen, Charles Carroll of Carrollton, aided in laying the cornerstone. He stated, "I consider this among the most important acts in my life, second only to my signing the Declaration of Independence, if even it be second to that."

Baltimore turned out en masse for a tremendous celebration. A deputation of hatters presented a beaver hat to Mr. Carroll and another to General Samuel Smith, Senator of Maryland in Congress. Thousands joined in singing a song written especially for the occasion.

"O we're all full of life, fun and jollity,
We're all crazy here in Baltimore.

Here's a road to be made
With the pick and spade,
'Tis to reach to Ohio, for the benefit of
trade;

Here are mountains to be level'd.
Here are valleys to be filled,
Here are rocks to be blown, and bridges
too to build.

And we're all hopping, skipping, jumping,
And we're all crazy here in Baltimore.

And when the road is made,
With the pick and the spade,
In the locomotive engine, they will put a
little fire,

And while the kettle boils,
We may ride three hundred miles
Or go to bed in Baltimore and breakfast
in Ohio.

Where they're all waiting, hoping, praying
For a quick way to come to Baltimore!"

Fortunately for the B. & O., Jonathan Knight, its chief engineer, and the Army engineers did a better job of scanning the route than the unknown song writer who wrote the commemorative lyrics.

Work proceeded swiftly as far as Ellicott's Mills with six-inch by six-inch wood stringers laid on oak cross ties at three-foot intervals, topped by strap rails serving as a roadbed. On January 7, 1830, the B. & O. started its first regularly scheduled trips which through to the present have continued uninterrupted.

The first run was from Pratt Street, Baltimore, to the Carrollton Viaduct. Tickets cost nine cents apiece or three for a quarter. The B. & O.'s Mt. Clare Station was com-



N. W. DARRELL

Southern

Nicholas W. Darrell was engineer of *Best Friend* of Charleston, first designed for regular service.

pleted on May 24, 1830. It is America's oldest surviving railroad station. From its platforms the first trains were dispatched from Baltimore to Ellicott's Mills with a seventy-five-cent price tag on the horse-drawn trip.

On the Ellicott's Mills to Harper's Ferry stretch, which was ultimately spanned by December 1, 1834, the B. & O. switched to granite stone sills and wood rails with iron strap capping.

SOUTH CAROLINA CANAL & R. R. CO.

But even as the B. & O. was functioning smoothly under horse power, the South Carolina Canal and R. R. Co. was hard at work on its railroad which it hoped would be the means to make Charleston a great seaport by providing low cost transportation between the port and the fast developing inland areas.

Work began at Charleston January 9, 1830. On December the 25th of that year, the first six miles of the road were opened. It was chief engineer Horatio Allen who finally persuaded the directors of the board to use steam locomotion.

When actual work began at Line Street, Charleston, the construction was quite unique. Two rows of eight-inch-square pilings were driven, the rows spaced six feet apart with six-and-a-half-foot intervals between the pilings. Ties six inches by nine inches in length were then mortised to the top of the pilings. Stringers were also six by nine inches and these were notched to the ties. Iron strap, one-half



Southern

One horse power drove experimental Flying Dutchman of SCC & RR. Steeds were uncooperative.

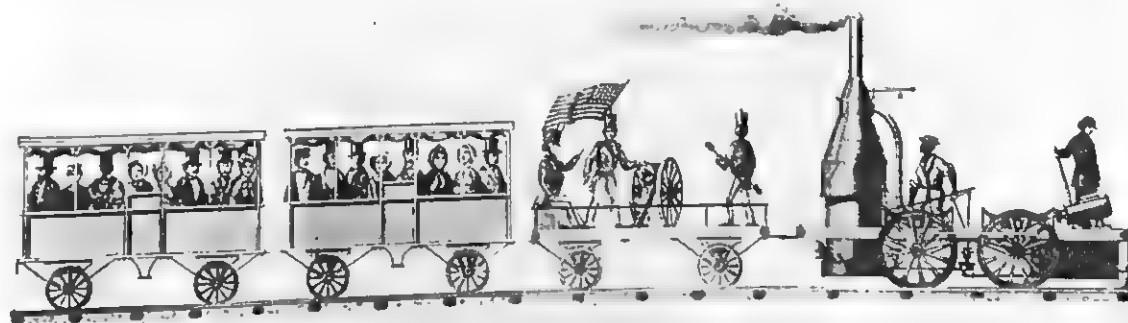
inch thick by two and a half inches wide was spiked to the edges of the wood stringers to form the actual running surface. The rail span was five feet.

Before Allen had been able to persuade the Board of Directors to use steam motive power, several other experiments were tried. A sail car rigged like a small boat and naturally powered by the wind figured in the early experiments but was quickly written off as being impractical. Actually, sail had first been tried in Holland in 1620 when boat-like cars carrying twenty-eight passengers had covered a forty-two-mile stretch of beach in two hours.

In September of 1830, \$300 in cash prizes were offered by the railroad to stimulate interest in designing experimental locomotives. The winning vehicle—a car designed by D. C. Detmold, powered by a horse walking a treadmill geared to the wheels—outstripped two somewhat similar cars using manpower in two-men team shifts. The *Flying Dutchman*, as the horse-powered job was called, made one short trip hauling twelve passengers at an estimated twelve miles an hour.

In contrast to these, Allen had been given approval to commission The West Point Foundry of New York City to build a locomotive which ultimately cost \$4,000 (by comparison, a modern diesel locomotive costs approximately \$700,000).

On October 23, 1830, the engine, named *Best Friend of Charleston*, arrived aboard the steamer *Niagara*. Charlestonians were eager to get a look at the steam horse which



Southern

On December 25, 1830, the first regular steam rail service in America began when the *Best Friend of Charleston* puffed away from Charleston, S. C., at twenty miles an hour. Brooms tied to engine swept rails.

they hoped would pull the city from its economic doldrums. Cotton trade and retail business in Charleston had slumped badly. Much of the lucrative cotton business had shifted to Savannah, more readily accessible to the plantation owners by barge and steam packets.

Best Friend was a lightweight, weighing in at less than four tons. It developed only six horsepower. All four wheels were driven from two inclined cylinders mounted inside from two inclined cylinders mounted inside and at the front of the frame. At the rear of the locomotive a bottle-shaped metal chimney enclosed a vertical boiler with a furnace at the bottom and outlets leading to the outer jacket and smokestack.

On Christmas Day of 1830, the *Best Friend of Charleston*, hooked to two high-sided covered wooden wagons with bare board benches for seats, headed out of Charleston with a load of passengers.

One passenger describing the trip stated, "Away we flew on the wings of the wind at the speed of fifteen to twenty-five miles an hour, annihilating time and space, and leaving all the world behind. . . . The engine darted forth like a live rocket, scattering sparks and flames on either side, passed over three saltwater creeks hop step and jump, and reached the end of the line at State and Dorchester Roads before any of us had time to determine whether or not it was prudent to be scared."

Actually, though history lists December 25 as the beginning for railroad passenger service out of Charleston, North Carolina.

earlier and less impressive trials of the *Best Friend* are usually omitted.

E. L. Miller of Charleston designed the boiler, which included multiple tits on the inner surface of the firebox to offer greater radiation. When the completed *Best Friend* was delivered, Julius Detsch and Nicholas Darrell ran the initial tests. On its first test run, the running gear proved too weak for the *Best Friend*. A wheel collapsed and flung the four-ton steamer into a ditch. More than a month's repairing was necessary before the *Best Friend* was ready for another unofficial jaunt.

On December 14, 1830, with forty not-too-willing passenger recruits from among the company's laborers, the engine proved successful and made a top speed of twenty miles an hour. Darrell was so intrigued by the locomotive that he gave up his machinist job and volunteered his services as engineer.

June 17, 1831, when the *Best Friend* had been engaged in about a half year's regularly scheduled passenger runs, an accident occurred that nearly led to Darrell's death. A Negro fireman annoyed by the constant hissing of escaping steam, shut the exhaust valve. Darrell was badly burned in the ensuing explosion which scalded the fireman to death and blasted the *Best Friend* temporarily out of business.

Meanwhile a second locomotive, the *West Point*, had arrived from the same foundry. It was basically the same size and weight as *Best Friend*, but had a horizontal, tubular boiler. On March 5, 1831, pulling a bar-



Best Friend was destroyed when boiler exploded. It was rebuilt with boiler between driving wheels and renamed the Phoenix.

B&O

This South Carolina RR advertisement appeared in the 1835 issue of Miller Planters and Merchants Almanac. Fare was five cents a mile for 136 miles. Southern

SOUTH-CAROLINA RAIL-ROAD.
Between Charleston and Hamburg, S. C. opposite Augusta, (Ga.)
Distance 136 miles, performed in daylight 6, and 1/2 A. M. to 6 P. M.
President, John Ravenel. Directors—Wm. Aiken, A. Black, Wm. Bell, J. J. Bullock, Dr. S. H. Dickson, John Dixon, H. P. Fisher, John H. Gentry, G. J. Howland, Dr. Joseph Johnson, T. P. Tucker, Inditor, Henry Ravenel. Secretary, J. P. Robertson. Principal Engineer, H. Allen.

RATES OF PASSENGER.

| From Charleston to | Miles | From Hamburg to | Miles |
|--------------------|-------|-----------------|---------|
| Woodstock | 15 | Aiken | 51 |
| Summersville | 21 | Blackville | 75 |
| Indianola | 33 | Wadsworth | 90 |
| Branchville | 62 | Brimley | 94 |
| Milway | 72 | Indianola | 104 |
| Blackville | 99 | Summersville | 104 1/2 |
| Aiken | 129 | Wadsworth | 115 |
| Hamburg | 136 | Charleston | 136 |

And from one intermediate station to another, FIVE CENTS per mile. Children under 12 years and Coloured Persons, half-price.

Regulations for the Passenger Carriage.

1st. All baggage at owner's risk—75 lbs. allowed. 2d. Servants the not admitted, unless having the care of children, without the consent of all the Passengers. 3d. Passengers not allowed to stand on the outside platform. 4th. Making prohibited. 5th. No gun or fowling piece shall be permitted to enter the Car unless examined by the Conductor. 6th. The feet not to be put on the Carriage, nor the Carriage soiled, defaced or injured in any way. 7th. Dogs not admitted into the Passenger Cars. 8th. At the ringing of the bell, Passengers will be allowed one minute to take their places. 9th. Seats must be occupied for fifteen minutes previous to the hour of departure. As a general direction, the conductors of the Carriages are instructed not to permit any conduct that is inconsistent with good order, or the comfort and safety of the Passengers; for which special end these rules have been established, and are required to be enforced with civility but strictly.

HOURS OF DEPARTURE AND ARRIVAL.

UPWARD PASSAGE.
LEAVE CHARLESTON, at 6 A. M.
To W. do. do. do. running time and stoppages 11 1/2 hrs.
Not to arrive before 5 p. m. post 7 A. M.—Brimley 20 minutes.

rier car and four passenger cars with a total of one hundred and seventeen passengers, it made a five-mile test run in nineteen minutes. The barrier car was placed between the locomotive tender and the passenger cars. Six bales of cotton were strapped to it to offer passengers peace of mind and protection from steam or hot water should a boiler break occur, a not infrequent occurrence during railroading's earliest days.

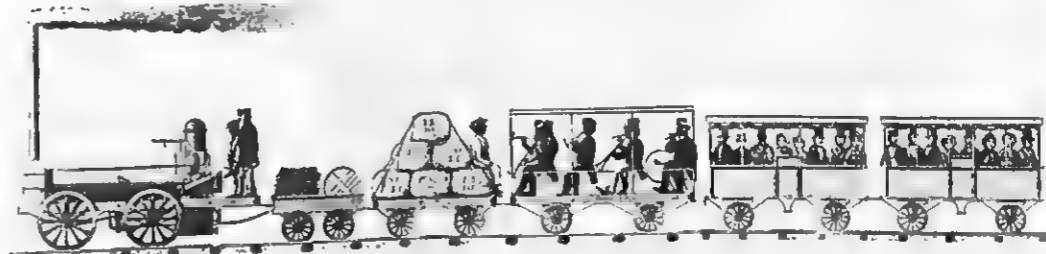
The West Point, which was the road's only locomotive from the time Best Friend blew its top until February 1832, was not overly satisfactory nor was the line's third engine, the South Carolina. The Best Friend eventually was rebuilt and returned to service on October 18, 1832, renamed Phoenix.

136 MILES BY RAIL

Important to railroading history is the fact that on October 1, 1833, when its entire one hundred and thirty-six-mile length from Charleston to Hamburg, South Carolina, just across the Savannah River from Augusta, Georgia, was opened, the South Carolina Canal and Railroad Company became the longest railroad in the world. Earlier, in 1831, the S. C. C. & R. R. Co. loaded on some mail sacks and thus became the first railroad to perform the important service of carrying mail.

An account by a New England traveler, who like many of the S. C. C. & R. R.'s early passengers made the trip from Charleston to Hamburg purely for the experience of riding on the world's longest rail route, stated:

"Before we started, the engine was sent



The West Point pulled this excursion group in 1831. Car behind engine and stacked with cotton bales was known as a barrier car, installed to protect passengers from scalds of occasional boiler explosions.

Southern

off for some distance to be tried. After the passengers had been detained some quarter-hour beyond the appointed hour, we started out at the rate of ten or twelve knots. The country, as far as the eye could see, was shaded with here and there a solitary live oak, and woods of pitchpine. In a little while the speed of the engine began insensibly to diminish, and soon after came to an end. The cause of this stoppage I was told was 'want of steam.' So after Sambo had been sent to pick up some brush and other procurable fuel, the engine began to go again—like the Dutchman who while advancing in the march, stopped to light his pipe, that he might attack the enemy under cover of the smoke.

"The management of the engine was indeed wonderful. Now it went as if Satan were at its heels; now it scarcely dragged its freight. Several times it came to a dead stand, for 'want of steam.'

"After continuing in the afternoon in the above manner—stopping, then going fast, then slow again—we arrived at two or three log houses, and one half built 'tavern' amid a half burnt forest of pitchpine. Here was Blackville. A few fires glimmered on the ground; a square roughboarded fabric stood by the roadside, which was the 'store house.' Here was to be our tarrying place for the night. We had accomplished the wonderful distance of 90 miles from 8 a.m. to 6 1/2 p.m. on a railroad, through a country with a hard soil, and not a hill rising twelve feet the whole journey. The whole country for 100 miles from the seacoast is as level as your frog pond.

"After warming ourselves, we were shown into a room furnished with a few

old chairs and a table. The food upon it was good; the cooking probably that of slaves—miserable. After supper I went out and stood by the fire in the open air. At last tired and fatigued I applied for a couch to the landlord. There were, I believe, but five rooms, and twenty-five or thirty passengers were to share them. The landlord led me to a room containing three beds. The room was occupied by four—A New Yorker and a Georgian in one bed, a real tar in a second and myself in a third. The Georgians have naturally some of the best of hearts. Hence why a Yankee should be thought worthy of one's society. A South Carolinian would have shunned the New Yorker as if a wild beast.

"There being no appeal from this mode of sleeping, a submission seemed best. Five rooms were built, opening into one entry separate from each other by a boarded partition, of which the cracks were one inch only in width. Besides, the partitions did not extend to the top. The rooms very much resembled a row of stalls on a stable, open above. Anything said at one end could be heard at the other. In one of them were several ladies.

"After having slept soundly, the bell rang and 'get up' was the watch word. Having dressed, the door to breakfast soon opened. Of the latter I make no complaint except of its cooking. The fee of \$4.00 was paid, and we started again.

"The road continued as before. The land grew uneven. Long and undulating hillocks appeared. Where those were cut through the ground exactly resembled (red) brick dust. Here commenced the upland. Nearly 100 miles had been one vast flat plain.



Washington's first depot was built in 1835. It stood at northwest corner of 2nd Street and Pennsylvania Ave. First train to steam into capital was Atlantic.

B&O

"The country grew more hilly until we reached Aiken, 120 miles from Charleston, where the car stopped, and our baggage was taken out and put into another car, to go down the 'inclined plane.' The old car immediately returned to Charleston. The new one was let down the inclined plane by Negroes. Its perpendicular descent might have been 200 feet, in a horizontal distance of 1200. On either side was a stand with railings. Two Negroes on each stand turned a crank in its center. We soon began to go about five or six miles an hour. The country became more hilly in our cruise. At 4 p.m. the car stopped at Hamburg, 136 miles from Charleston. Having been apprised of the fare—seventy-five cents each—demanded by the stage for carrying passengers across Augusta bridge, I slipped a quarter into a Negro's hands and walked on foot while he lugged my baggage to the U. S. Hotel in the city. The stage driver seemed chagrined. . . .

"The U. S. Hotel is a large airy building where the fare is only \$1.50 per day," concludes this report in *Centennial History of South Carolina Railroad* by Samuel Melancthon Derrick.

The S. C. C. & R. R. Co. had several other firsts to its credit. On January 15,

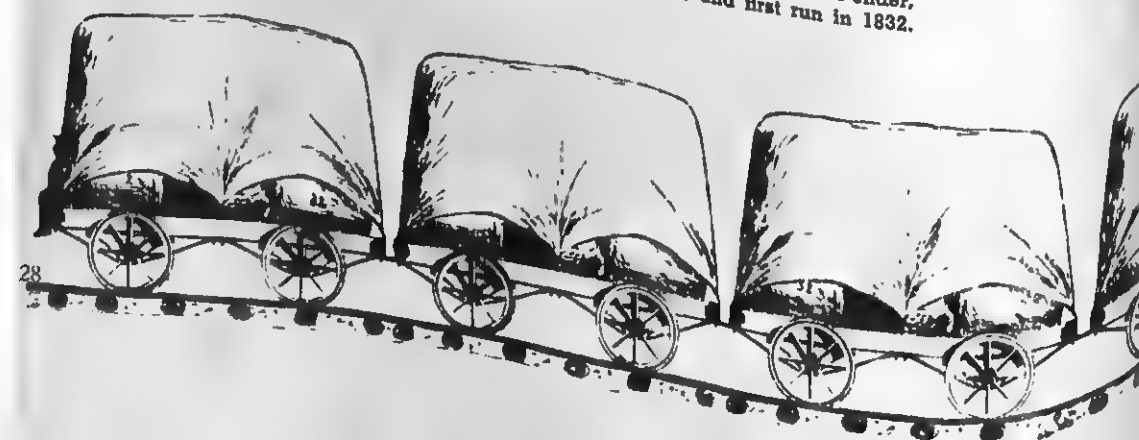
1831, the first honeymoon railroad trip was made by Mr. and Mrs. Henry L. Pierson of Ramapo, New York. One can't help but wonder what accommodations they had at Blackville.

Horatio Allen foresaw the time when locomotives would be used in night runs and he considered it wise even prior to the opening of the entire line in 1833 to experiment with a means of night lighting. In describing this first trial Allen said, as quoted in *Centennial History of South Carolina Railroad*:

"It was thought well to make trial of such running by night, that it might be known what it was necessary to provide. For such trial two platform cars were placed in front of the locomotive. On the forward platform was placed an inclosure of sand, and on the sand a structure of iron rods somewhat of urn shape. In this structure was kept up a fire of pine wood knots. Suitable signals as to the rate of speed, etc., were provided. The day preceding the evening of the trial closed in with as heavy a fog as I have ever seen, and I have seen a first-class London fog. But the fog did not prevent the trial when the appointed time came.

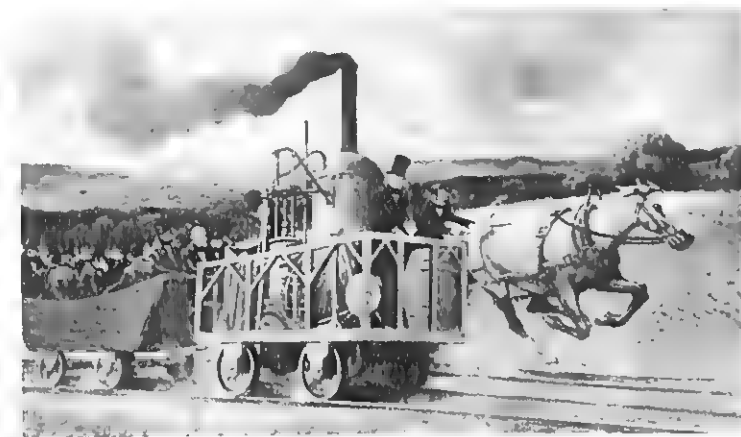
"The country to be run through was dead

The third locomotive to be put into service on the South Carolina RR was a double-ender, South Carolina, designed by the line's engineer, Horatio Allen, and first run in 1832.



Peter Cooper set up and ran the Tom Thumb, experimental locomotive. Legend says it was winning an 1830 race against horsecar when blower broke. But steam won out in the end.

Painting by H. D. Stitt—B&O



level, and on the surface rested this heavy fog; but just before we were ready to start, the fog began to lift and continued to rise slowly and as uniformly as ever curtain left the surface of stage, until about eighteen feet high: there it remained stationary, with an under surface as uniform as the surface it had risen from. This under surface was lit up with radiating lines in all directions with prismatic colors, presenting a scene of remarkable brilliancy and beauty.

"Under this canopy, lit on its under surface, the locomotive moved onward with a clearly illuminated road before it; the run was continued for some five miles, with no untoward occurrence, and I had reason to exclaim, 'The very atmosphere of Carolina says, Welcome the locomotive.'"

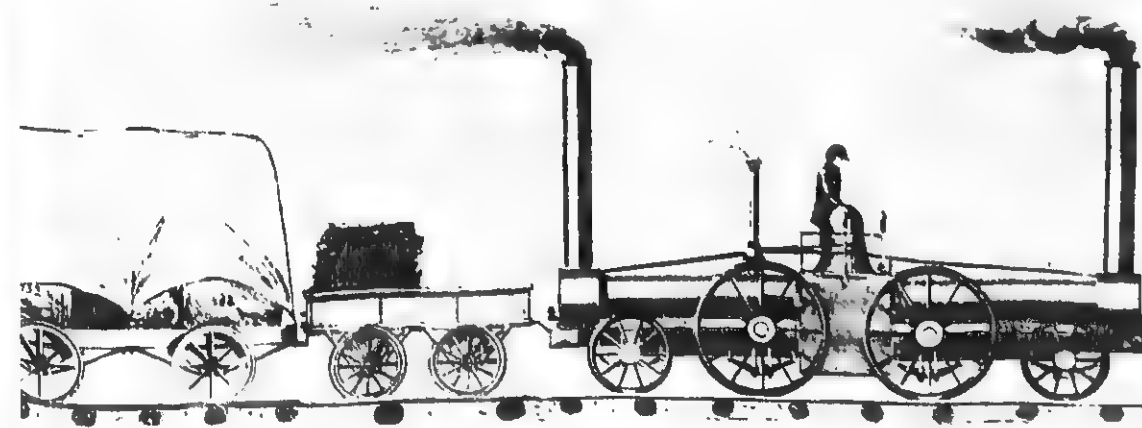
On June 30, 1831, The Baltimore and Ohio became the first American railroad to carry troops, when on that date Brigadier General George H. Stewart with the First Division Maryland Guards plus one hundred volunteer troops were transported to Sykes Mills, now Sykesville, Maryland, to put a stop to a riot of railroad workmen who were striking for long overdue back pay. In this instance, a dishonest contractor had skipped without paying the men.

The problem was compounded when a swindler in Boston advertised in a Boston newspaper for B. & O. laborers, registered hundreds of them, collected transportation fees and then also absconded with the money.

On the Baltimore and Washington branch of the B. & O., whiskey, not pay, was the cause of labor problems. John Watson, superintendent of a construction gang, issued an edict that no whiskey would be permitted in any of the railroading camps.irate workers dragged Watson and two assistants, William Mercer and John Callon, from their beds and shot them—Watson and Mercer fatally. For a time at least, construction supervisors were a little less overbearing.

THE TOM THUMB

Peter Cooper, a wealthy and distinguished citizen of New York, had purchased three thousand acres of property along the right of way of the B. & O. When B. & O.'s directors failed to make the progress Cooper thought was to be expected, the New Yorker took destiny into his own hands to find a way to stimulate speed along the new line since taxes were adding to his losing investment. Unable to con-





B&O

Typical of the small capacity freight cars first used is this flat bed truck type with pin couplers of the B. & O.

vince the directors of the value of trying out one of the new English steam locomotives, Cooper went to Baltimore and took with him parts necessary for an experimental locomotive.

The *Tom Thumb* which he set up and operated under its own power was not immediately successful but the early date of its first trial is impressive. The *Tom Thumb* was so small that it has been considered by many only a primitive model. Its single cylinder, $3\frac{1}{4}$ " by $14\frac{1}{2}$ ", developed only 1.43 horsepower. Its boiler tubes were fabricated from musket barrels. While Stephenson had turned the exhaust of his locomotives into the boiler stack, to serve as a muffler and quite inadvertently discovered forced draft, Cooper had a bellows type blower on the *Tom Thumb* which worked from a belt drive on the axle to achieve much the same result. The diminutive locomotive first was tried in September 1829, but was unsuccessful and had to be further refined. On August 28, 1830, pushing a small open car with eighteen passengers aboard, it made the nearly fourteen-mile trip to Ellicott's Mills in an hour and a quarter non-stop. It was on the return trip that the legendary race between *Tom Thumb* and a horse-drawn train took place. Reports would have it that the *Thumb* was well on its way to defeating the horse when the blower belt broke.

B. & O. SWITCHES TO STEAM

In the beginning Baltimore and Ohio rented its horses from stagecoach companies and no horse was required to pull a car more than six or seven miles. In-

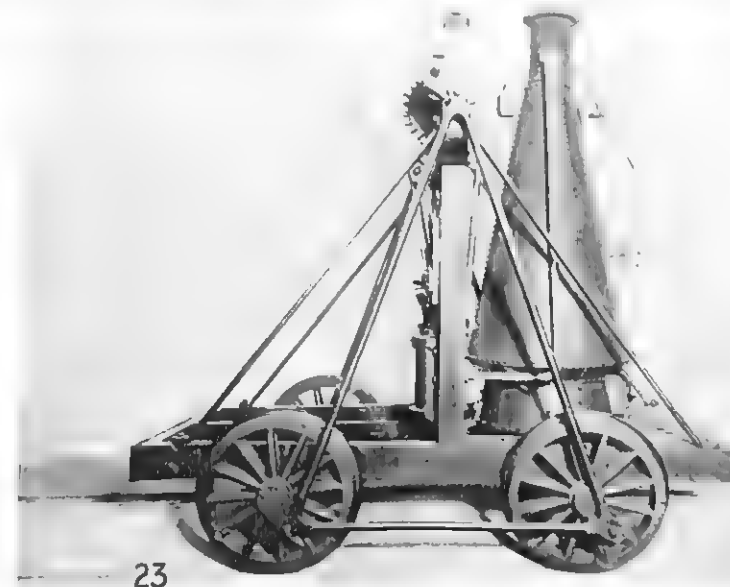
cluding food, stabling and necessary personnel to groom and care for the horses. Accounting showed that the work done by horsepower would cost \$33 a day. This plus the difficulties B. & O. management foresaw in using horsepower all the way to the Ohio River with the tremendous number of relay stable stations to equip and maintain, caused them to view Cooper's invention with considerably greater interest.

In January of 1831, the B. & O. directors, convinced that steam might combine economy with speed, offered a prize of \$4000 for the best steam engine to be entered in a contest scheduled for June of that year. It called for a coal burning engine that would weigh less than three and a half tons and still be capable of drawing a fifteen-ton load at fifteen miles an hour or better. A second prize of \$3500 was offered.

Disappointingly, only five entries made their appearance. The best of these was the *York*, designed and built by Phineas Davis, a watchmaker from the Pennsylvania town for which his engine was named. Davis arrived in Baltimore with his dismantled locomotive loaded in an ox-cart. The mass of metal tubes and wheels was unimpressive but once assembled. B. & O. specifications, but negotiated the sharpest turns at the maximum average fifteen required and made bursts of thirty-miles-per-hour speed on straightaways. Further, it was found that the *York* could be operated for \$16 a day, less than half as much as the average for the animal pow-

B&O

James I, with conical boiler, two vertical cylinders, link motion valve gear ran successfully in the B. & O. test.



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In July of 1831, the *York* was placed on a one-trip-a-day schedule, hauling as many as five passenger cars in a group. Groups of cars on trains at that time were called brigades.

B. & O. was fortunate, not only to obtain the talent and services of Davis who set up a locomotive shop in Baltimore but also those of his versatile, assistant engineer, Ross Winans. Winans' first contribution to better road holding characteristics was to reverse the wheels of cars and locomotives by placing the flange on the inside rather than the outside. It was he, too, in 1831, who produced the first eight-wheeled passenger coach, made up of two trucks or sets of four wheels at each end of the car. This first eight-wheeler was called the *Columbus*. Its design made possible competition by the railroads with the roomy comfort offered by canal packet boats.

Winans, too, saw the advantage of having the axle turn with the wheels, a feature still in use in railroads today.

When Phineas Davis rode to his death in the *York* on September 27, 1835, when rails spread on the newly opened Washington Branch, Winans and George Gillingham took over the operation of Phineas Davis' Mt. Clare Railroad Shops, which eventually became a part of the B. & O. It was in these shops that Winans developed his anti-friction journal, an inside flanged conical wheel, which reduced friction from $1/240$ th of over-all weight to $1/400$ th.

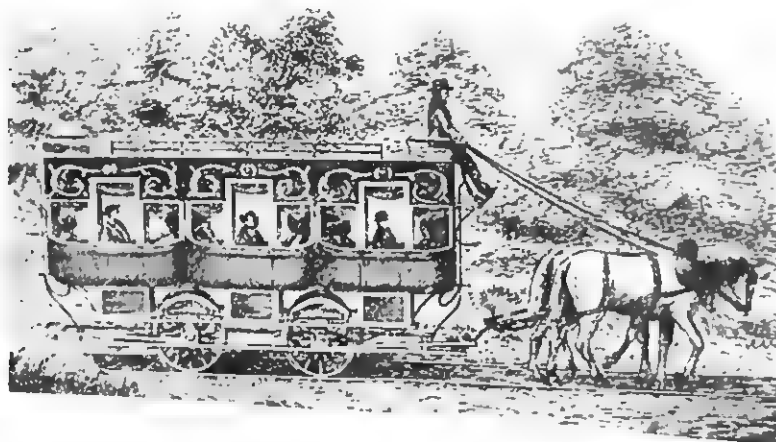
In its first two and a half years of operation, the B. & O. transported 300,000 passengers, without a single accident causing death or injury. This is remarkable considering the primitiveness of the early

The B. & O. used horses for several years on their line. Here artist H. D. Stitt shows change of horses at Relay, Md., station, near Baltimore.

B&O



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PRR

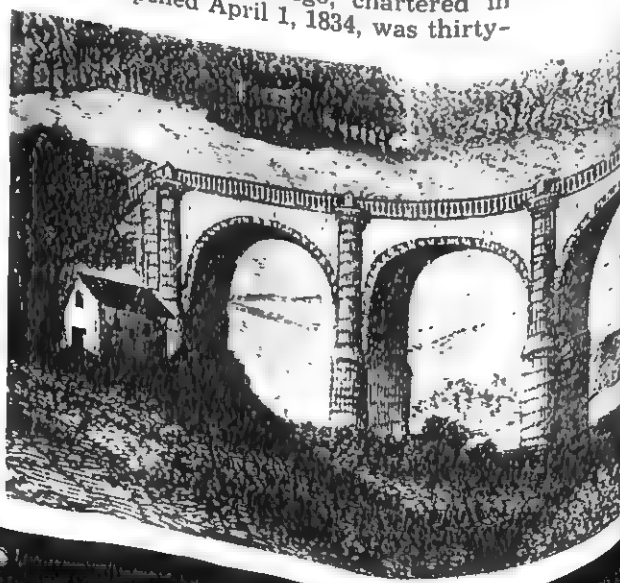
First operating link of Pennsylvania RR was horse-drawn section of 20 miles. Philadelphia to Paoli, opened 1832.

equipment and the road beds. This record, however, was marred in November 1833, when the first fatality on its line occurred near Ellicott's Mills. A drunk had passed out or fallen asleep on the rails, the first of a long series of such accidents in railroading's history.

By the close of 1835, steam had wholly taken over and the B. & O. was firmly established with seven locomotives, forty-four passenger cars and 1028 freight cars making up the impressive total of its rolling stock.

Many of its passengers were mere curiosity seekers, ranging from vacationing farmers to foreign diplomats. Baron Krudener, Russian Envoy from the Emperor, for example, was so impressed by his ride on the sail car, *Aeolus*, that he had a model made and sent to the Czar. His glowing report of the wonders of the B. & O. line led to the building of the railroad from St. Petersburg to Moscow. The greatest attraction on the B. & O., even exceeding interest in the locomotives and passenger cars, was the Thomas viaduct. It was designed by Benjamin H. Latrobe to bridge the Patapsco River on the Washington Branch. The curved granite structure with its eight magnificent arches still stands and is in use today.

An outstanding accomplishment of railroading's first decade in America was the eight-arched granite bridge across the Patapsco River in Md.



EARLY RAILROADS OF THE EAST

Meanwhile steam railroading and projected lines were sweeping the eastern seaboard. By 1835 more than two hundred railway charters had been granted in eleven states and over a thousand miles of railroad were already in operation. It must be remembered, though, that few of these early chartered companies ever succeeded in actually building completed railroads and but few of those to reach completion continued to operate for more than a brief period of time. But in many instances some of the short half-dozen mile long railroads of the 1830's later became parts of important railway systems of today.

The Philadelphia to Paoli twenty-mile-long single track road started with horse-drawn operation September 20, 1832. The Philadelphia to Columbia, Pennsylvania, section, which linked the Susquehanna River with Philadelphia and which was to become a part of the Pennsylvania Railroad system opened April 16, 1834. It was at the time a state operated public highway. Individuals and private transporting firms used P. & C. rails with their own cars and horses, paying tolls as high as 4c per mile per ton hauled.

The Ithaca and Oswego, chartered in 1828 and opened April 1, 1834, was thirty-

four miles long. This later was to be taken over by the Delaware, Lackawanna and Western.

Isolated and nearly wholly reclaimed by the wilderness is the Staple Bend Tunnel, four miles east of Johnstown, Pennsylvania, the lone remaining bit of construction of any consequence of the Allegheny Portage Railroad. Unused for eighty-five years, the tunnel is still well preserved and an important monument to early American railroading, for it was a vital link in a series of canals, inclined planes and railroad track levels that covered a thirty-six mile mountainous route from Johnstown to Hollidaysburg, Pennsylvania, a part of the Philadelphia to Pittsburgh canal rail route.

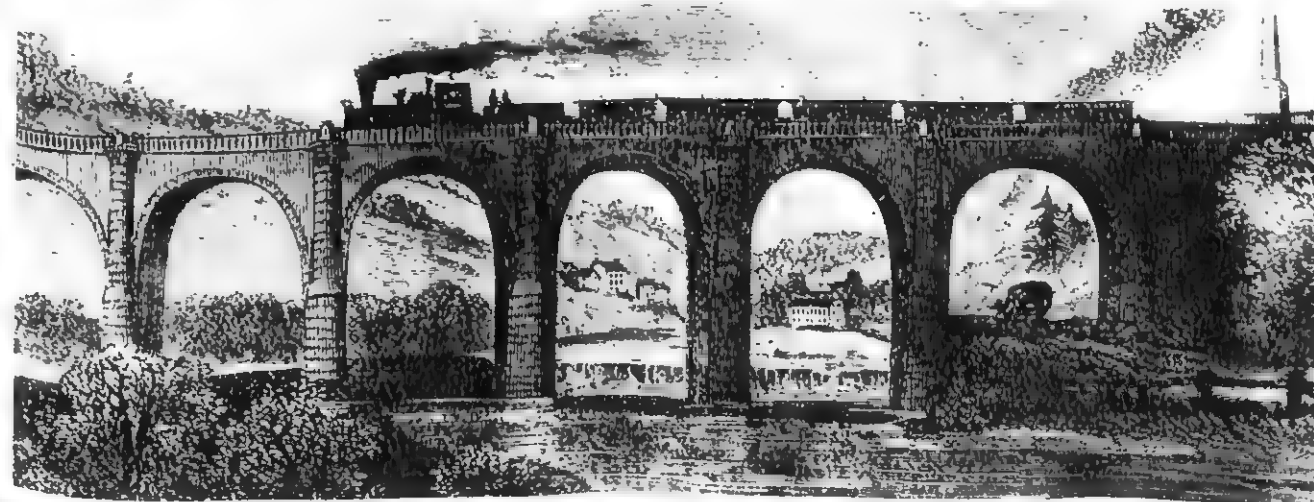
When the Allegheny Portage was opened in 1834, it was considered the engineering marvel of its day. The Staple Bend Tunnel itself was built at a cost of only \$37,500. It is 901 feet long, 20 feet wide and the arched interior is 19 feet high at the top of the arch. There were five distinct levels and five inclined planes on both slopes of the mountain with a straight, nearly flat rail stretch one and one-half miles long ranging the west approach to the summit. The plateau stretch began 1000 feet beyond the top of the first plane out of Johnstown Station. Here a 1700-foot section of rail

lifted passengers and freight 149½ feet to the entrance of the Staple Bend Tunnel.

Horses and locomotives were the power used on the levels. Stationary engines with line winding on revolving drums drew the cars up and down the inclined planes. The summit was 2397 feet above sea level, 1172 feet above the mean water canal height at Johnstown, and 1399 feet above the canal level at Hollidaysburg. The ten inclined planes covered 4.38 miles and overcame elevations of 2007 feet. The eleven level sections including the straightaway at the crest traversed 31.16 miles and a total of 564 feet in elevation. The steepest plane rose 10¼ feet in every 100 feet.

Although transportation over the route was a cumbersome thing at best, it offered a terrific improvement over Conestoga wagon or stagecoach and cut transportation costs for the distance between the two points from \$12.00 to less than \$4.00 a ton.

The original inclined tows were made with hemp rope, wire cable not being used until nearly a decade later. The tow lines to haul the ponderous loads were made up of eight twisted strands each between six and eight inches in circumference. The lines cost the company about \$3200 apiece and when tarred, sometimes lasted more than a year.





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Allegheny Portage Railroad's Staple Bend Tunnel is abandoned today but was America's first tunnel.

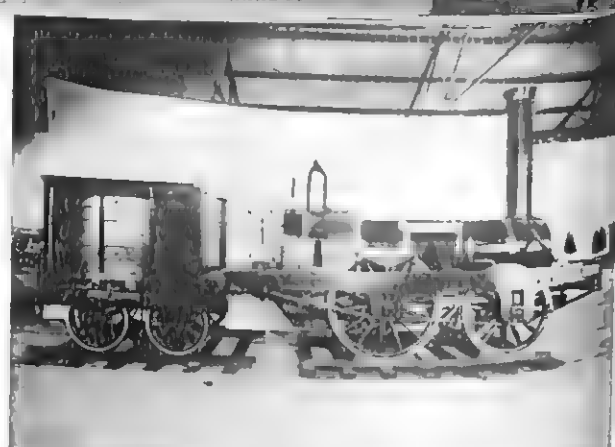
In November 1835, four locomotives, the *Boston*, *Delaware*, *Allegheny* and *Pittsburgh*, were put into use over twenty-two miles of the level section. However, it wasn't until 1837 that horses were eliminated entirely.

The Allegheny Portage Railroad was a part of the Pennsylvania state-operated Main Line of Public Works which included the Philadelphia and Columbia Railroad, the Eastern and Juniata Canal from Columbia to Hollidaysburg, and the Johnstown to Pittsburgh Canal, a route of 395 miles of which 117 were covered by railroad and 278 miles by canal. The combined train and canal boat trip took three and a half days as opposed to a former twenty days. This line was later to become the route of the Pennsylvania Railroad.

The present day Pennsylvania Railroad Company was not incorporated until 1846 and did not begin to function as a common carrier until 1849 so that it cannot be classed technically as one of the pioneer railroad organizations. However, since it purchased or leased roads which were among the first to be built in this country, the Pennsylvania's history properly belongs to the early days of railroading.

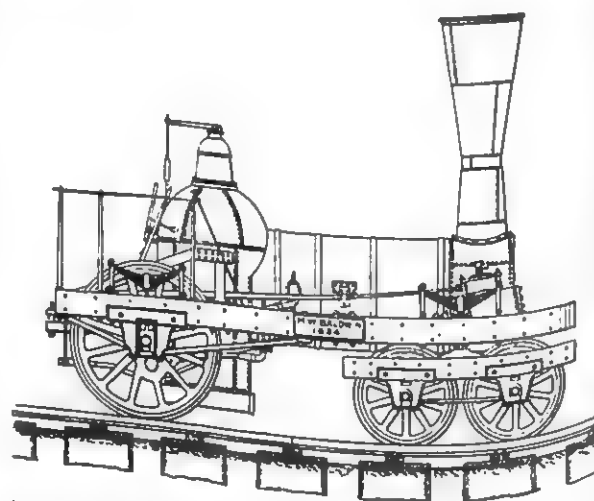
Matthias W. Baldwin, founder of the Baldwin Locomotive Works, had been well established as a locomotive builder by April 15, 1834, when the Pennsylvania legislature authorized its Canal Commissioners to use locomotives on the rail sections of its \$14,362,320.35 public road. By September of 1834, two Baldwins of the 4-2-0 type with 9-inch by 16-inch cylinders and 54-inch driving wheels and an over-all weight of 17,000 pounds were operating on the road.

Five English locomotives were also purchased as were two other American locomotives constructed by Coleman Sellers & Sons and Long & Norris.



B&O

Baldwin's first was Old Ironsides, 1832, built for the Philadelphia, Germantown & Norristown RR.

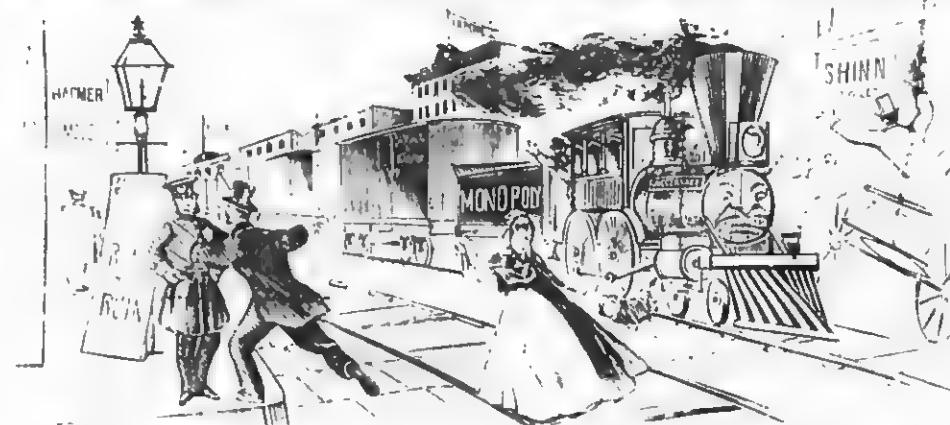


Matthias Baldwin's second, the E. L. Miller, was a 4-2-0 differing from the Ironside and Planet type.

Southern

Locomotives at this stage were very hard both on tracks and road beds, since each punch of the cylinder applied a definite road shock to the wheels, to the rails and the underlying foundation. The cylinders with connecting rods attached had over-ride only a part of this pounding by application of the power stroke to the extreme end of the driving wheel axle. And a shimmy had resulted from this type of power application, of which the *Rocket* serves as an example.

It was Coleman Sellers who came up with the idea of counterbalancing to offset wheel shimmy and rail pounding. Sellers accomplished this by inserting a heavy, wheel on the side of the wheel opposite to the connecting rod fastening. Actually, however, although Coleman Sellers and his



MOTHERS LOOK OUT FOR YOUR CHILDREN! ARTISANS, MECHANICS, CITIZENS!

When you leave your family in health must you be hurried home to find a

DREADFUL CASUALTY!

PHILADELPHIANS, your RIGHTS are being invaded! regardless of your interests, or the LIVES OF YOUR LITTLE ONES. THE CAMDEN AND AMBOY, with the assistance of other companies, without a Charter, and in VIOLATION OF LAW, as decreed by your Courts, are laying a

LOCOMOTIVE RAIL ROAD!

Through your most Beautiful Streets, to the RUIN of your TRADE, annihilation of your RIGHTS, and regardless of your PROSPERITY and COMFORT. Will you permit this? or do you consent to be a

SUBURB OF NEW YORK!!

Rails are now being laid on BROAD STREET to CONNECT the TRENTON RAIL ROAD with the WILMINGTON and BALTIMORE ROAD, under the pretence of constructing a City Passenger Railway from the Navy Yard to Fairmount!!! This is done under the auspices of the CAMDEN AND AMBOY MONOPOLY!

RALLY PEOPLE in the Majesty of your Strength and forbid THIS

OUTRAGE!

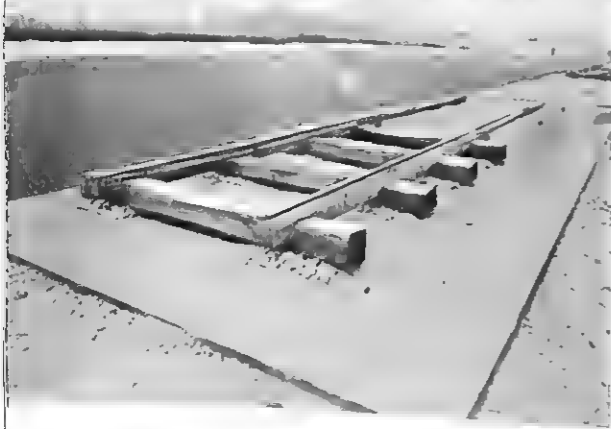
Anti-railroad publicity was often sponsored by worried canal and coastal-shipping stockholders.

PRR

sons at their Cardington, Pennsylvania, foundry worked out this counterbalancing system, the first practical application of it did not appear until 1837 when Thomas Rogers of the Rogers Locomotive Company built this characteristic into the driving wheels of his *Sandusky*.

The comparatively lightweight, rigidly wheelbased English locomotives were generally unsatisfactory and Baldwin cribbed his 4-2-0 design from Isaac Dripps' modified *John Bull*.

The State of New Jersey, which had been the scene of John Stevens' early charter,



Typical of iron strap top wooden rails are these in B. & O. exhibit—the kind used on the line between Baltimore and Ellicott's Mills, Maryland, in 1830. B&O

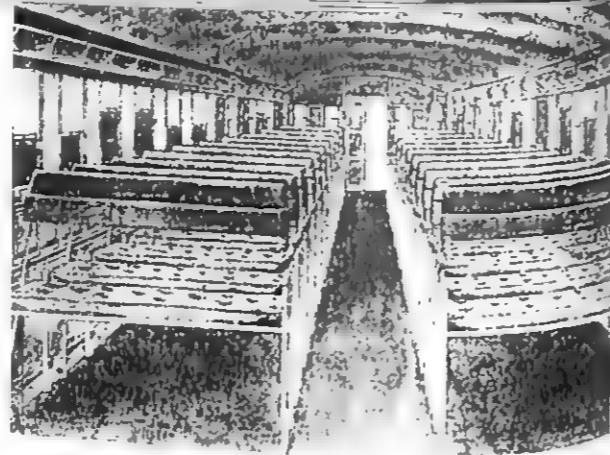
and his own locomotive experiment, was definitely a pioneer in the field. In 1832, the Camden and Amboy Railroad was completed between Bordentown and Amboy over a twenty-six and a half mile distance. By 1833, its Bordentown, New Jersey, to Camden link was completed. Thus by means of a ferry linking Philadelphia and Camden and steamboats plying the route from Amboy to New York, Philadelphia and New York were joined by rail and boat.

T-RAILS AND WOODEN TIES

Tracks on the Camden and Amboy were originally planned to be laid on granite sills. Robert Stevens, engineer of the Camden and Amboy, is credited with designing the forerunner of American T-rails. Early American railroad tracks had no ballast. Rails usually consisted of long wooden stringers, topped by narrow strips of iron. In most instances, the earliest roads used heavy blocks of granite as the road bed. These blocks were set in parallel rows, leaving the center lane between the tracks free for horse traffic. The iron straps frequently pulled loose from the wooden stringers. And not too infrequently did the torn iron capping spear up through the floor of passenger cars and threaten to impale the paying customers. The wildly flaying strips of metal were called "snake heads."

English engineers, very early in rail-roading history, had experimented with solid cast iron rails. These were usually rectangularly shaped with the wheels rolling on the narrower, upright edge, and were referred to as "edge" rails.

Stevens in 1830 journeyed to England to order a locomotive and also to contract with English foundries for necessary rail. During his voyage, Stevens whittled out a T-shaped cross sectional design and ordered



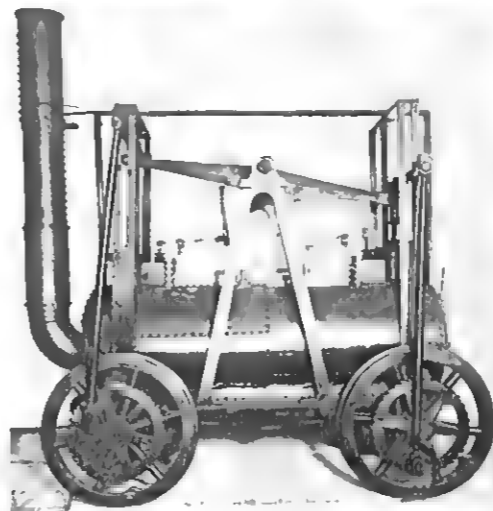
The interior of this Camden and Amboy passenger coach was sketched in 1833. First to link New York and Philadelphia, C&A is now part of the Pennsy.

PRR

the rails for the Camden and Amboy made to his pattern. Stevens' original design was 3 inches broad at the base, ½ inch thick through the center upright section and 2 inches across the top of the "T." The finished rails closely followed his original pattern being 3½ inches in over-all height and slightly broader and heavier in their base dimensions. The early miles of the Camden and Amboy had rails laid on typical stone piers in the fashion of the day. However, the granite for the piers was being quarried at Sing Sing, New York, and the quarrymen fell far behind in deliveries.

The new locomotive was already on its way from England and as a temporary expedient, Stevens laid a bed of wooden cross ties. Both to his surprise and to that of other pioneer railroad men, the cheaper temporary track foundation gave much easier replacement and cheaper maintenance. So actually due to the plodding workmanship of Sing Sing quarrymen, the forerunner of standard American track came into being.

The first locomotive to be used on the Camden and Amboy was built by Robert Stephenson of Newcastle-on-Tyne, England. Originally called the *Stevens* in honor of John Stevens, the Camden and Amboy's Planet-class four-wheeler was renamed *John Bull*. It had inside cylinders with two pairs of side-rod coupled 54-inch diameter driving wheels. The over-all weight of *John Bull* was eleven tons. When the *John Bull* was put into service on November 12, 1831, on the then only partially completed Bordentown and Amboy stretch, master mechanic of the Camden and Amboy, Isaac Dripps, quickly realized that the rigid wheelbase was not well suited to taking the curves on the road.



The *John Bull* was built in England in 1831 and retired in 1865; is still in operating condition.

PRR

The 1829 Howard, left, was designed but never built. Model shows ratchets on outside of wheels.

B&O

Dripps, therefore, rebuilt the *John Bull*, adding a two-wheeled leading truck, the wooden frame of which was hinged to the front axles. These leading wheels turned out to be effective guides.

Dripps, however, had to make further alterations to the *John Bull* since on several occasions the 4-2-0 was derailed upon striking cows which wandered on to the unfenced right of way. Dripps added two iron spears to the front of the leading wheels. The cowcatcher device was effective but was plenty rough on cows, so that Dripps twice more altered his locomotive cow protector, first using a crossbar and finally evolving the V-shaped leading truck which was to be a conspicuous feature of steam locomotives for many decades to come.

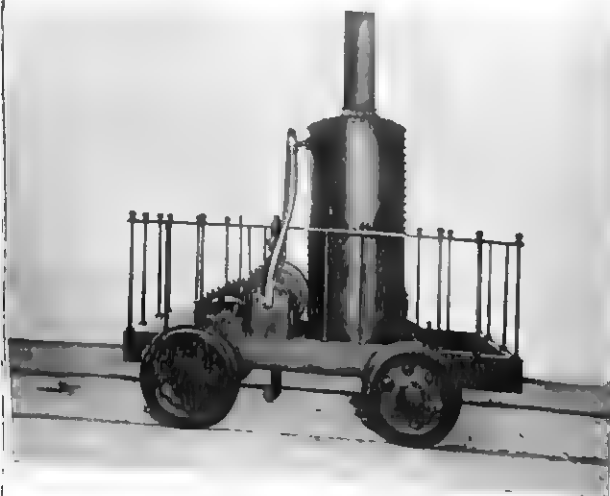
THE PONTCHARTRAIN

The Louisville and Nashville Railroad didn't secure its charter from the Commonwealth of Kentucky until March 5, 1850, but a part of the 5000-mile, more than century old, railroad today includes two of America's oldest railroads, the Pontchartrain Railroad in Louisiana which linked New Orleans with Milneburg 4.96 miles away on Lake Pontchartrain and the Lexington and Ohio Railroad in Kentucky which was originally planned to extend from Lexington through Frankfort, Kentucky, on to some undetermined point on the Ohio River. Actually, the road never developed beyond the twenty-eight mile Frankfort to Lexington distance. Short though both of these lines were, they were both pioneers and were the two oldest railroads west of the Allegheny Mountains. The older, the Pontchartrain R. R., was chartered January 20, 1830, and opened for horse power operation on April 23, 1831.

The road was fully completed on April 14th, but more than a week passed while final plans were made for the formal opening, which was replete with potent wine, pretty women and loud music. Prior to the advent of the Pontchartrain Railroad, New Orleans was cut off from Lake Pontchartrain, a beautiful body of water some forty miles long and twenty miles wide. In fact, New Orleans was very peculiarly situated. To its west was the muddy Mississippi. To the north Lake Pontchartrain and a considerable distance to the south, the Gulf of Mexico. Freight destined for Mobile and other Gulf coast cities had to be shipped either by boat down the Mississippi and thence to the Gulf, or through a canal to Lake Pontchartrain and from there by another canal to its destination. The intervening terrain was a vast bit of swamp land. Travel by land other than with a team or harnessed alligators was impossible.

To cut and construct the 150 feet of right of way, drainage ditches had to be dug, swamps had first to be cleared of trees and then filled before the rail line could be laid. Mortality among the laborers due to fever and dampness was extremely high. Yet under the direction of General Smith, formerly head of the U. S. Government Engineering Department, and with construction contract handled by Captain John Grant, another ex-West Pointer, wrought iron rail spiked to wooden sills, which were in turn bolted to cross ties, strung out across the road bed and the job was completed in slightly more than a year.

Early in 1832 the company decided to give steam a chance. John Shields of Cincinnati was offered an opportunity to demonstrate his locomotive which was shipped to New Orleans by steamboat. Shields' locomotive apparently had become lethargic.



B&O

World's oldest stone arch railroad bridge, built in 1829 near Baltimore, still stands and carries traffic.

The Childs, left, first rotary locomotive, raced but did not place in the B. & O. contest run in 1831.

B&O

gic during the trip and unused to moving under its own power. After repeated trials the Shields' engine failed to move. The Board of Directors, to offset Shields' expense, bought the contraption from him and used it as a stationary engine for sawing wood for ties.

The locomotive *Pontchartrain* arrived from England and was assembled and ready to run by September 17th of 1832. In a heavy, sodden downpour on that day, with 300 passengers crowded into a brigade of twelve coaches, the *Pontchartrain* entered regular service. Newspaper accounts of its inaugural trip indicated that the soddenness of the day was not due wholly to the rain falling for the 300 passengers did a quick job of christening the new locomotive and didn't waste any of the leftover spirits.

The *Pontchartrain* almost immediately thereafter had a run of bad luck. First, the new locomotive hit a cow. But even as the poor cow was gasping her last breaths, she had the satisfaction of viewing the iron horse, which had maltreated her, snorting and puffing upside down in the swamp beside the right of way. A few days later the *Pontchartrain* ran down and killed a small Negro boy. Then a series of claims were filed against the company due to the *Pontchartrain's* unpleasant habit of spewing blazing embers from her smokestack. Yet despite burned clothes, occasional dunkings in the swamp, business boomed and passengers came back for more—and this in spite of the 75c fee for the five-mile, one-way trip.

A small turntable was constructed at either end of the road and each piece of equipment had to be handled separately. Small cranes were used to handle the freight. Against the express wishes of the Board of Directors, Captain Grant raised the level of the floors of the freight depots

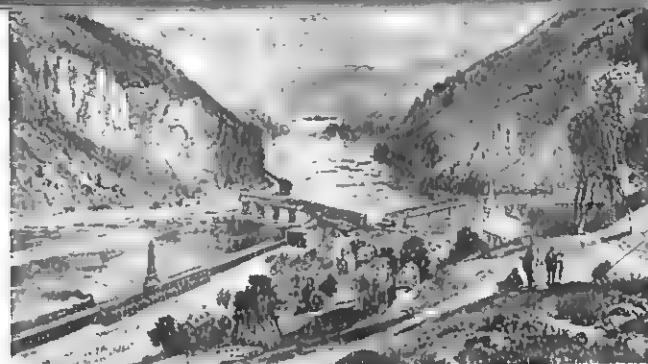
even with the floors of the cars. The experiment proved to be quite a success and speeded up freight handling considerably, so that in addition to being the first railroad in the Mississippi Valley, the *Pontchartrain* also had the distinction of having the first raised freight platforms in railroading's history.

Until its abandonment in 1935, the *Pontchartrain* operated nearly twenty years independently and for another eighty-five as part of the Louisville and Nashville Railroad.

THE LEXINGTON & OHIO

In Kentucky, Louisville and Lexington had been strong rivals but prior to 1825 Lexington was the undisputed metropolis of the state, boasting the first college west of the Alleghenies and a society that combined culture, wealth and charm. But with the increase of Ohio River steamboat traffic, Louisville began to expand rapidly and offered a threat to Lexington's title of Queen City of the State. Lexington was not on any navigable stream and so like Baltimore, Philadelphia and Charleston, the Lexington and Ohio Railroad was chartered with the hope of increasing Lexington's commerce.

Within five days, all but \$5,000 worth of stock had been sold. Cost for construction was estimated at \$8,000 a mile. H. J. Ranney, a former B. & O. employee, was hired at \$1,200 a year as the company's chief engineer. Ranney was a disciple of the stone age of railroading, and he insisted upon using limestone sills for the strap iron rails rather than wood. The stones used were not uniform in size but ranged from two to eight feet in length, averaged one and a half feet in width and about one foot in thickness. The stones were placed end to end, parallel in rail fashion, 4 feet 3 inches apart and in the top surface, a 3½-

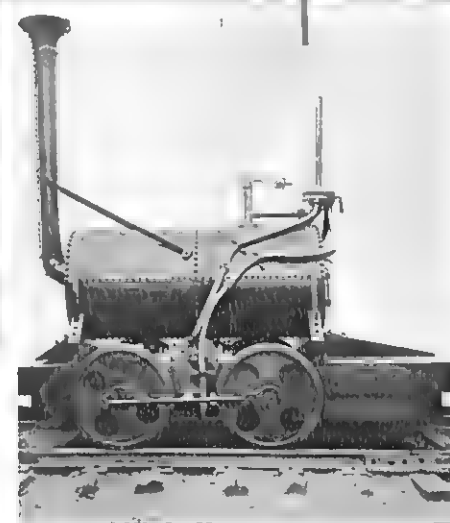


B&O

By the end of 1834, the Baltimore & Ohio had extended their road bed to Harpers Ferry, Virginia.

Costell, right, had oscillating cylinders, flanged drivers, horizontal boiler, but failed B. & O. test.

B&O



inch groove was cut to accommodate the wheel flange. On the outside of this groove, ½-inch by 3-inch broad, 20-foot long straps of iron were laid. The strap iron and the stone sills were bored and black locust wood dowels were tamped or molten lead was poured into the holes. Spikes were then driven through the strap iron holes into the lead or wood fill.

The route of the Lexington and Ohio was as snaky a line as one could find, for in this bluegrass country, farmers were loathe to have their farms cut and the roadbed had to meander along boundary lines between properties where right of way was more readily purchasable.

The *Pontchartrain*, by contrast, was dead straight and level and on clear days, one could stand at the turntable at one end of the Mississippi road and see the train on the turntable five miles away.

The Lexington and Ohio got off to a big start on January 27, 1830, when the first rail stone was laid. Three military companies were on hand. Literally dozens of bands, doctors, lawyers, merchants and school children paraded through the streets of Lexington to honor the occasion. Church bells rang and cannons were fired as the first man of the State of Kentucky, Thomas Metcalfe, took a gubernatorial peck at the first spike to connect the first iron rail to the first stone sill.

By August 16, 1832, a mile and a half of track was ready for cars. Governor Metcalfe was called out again and all of the townsfolk gathered to watch forty selected dignitaries make the initial trip on the line.

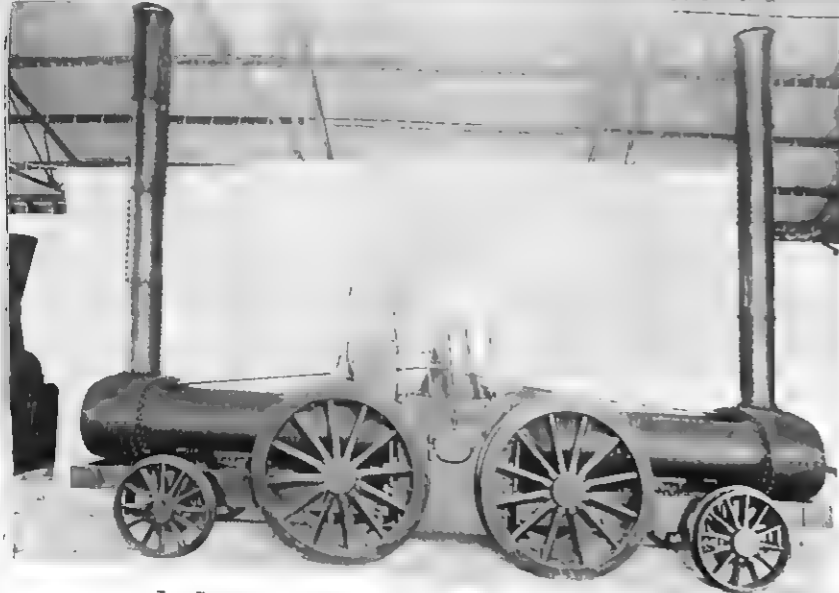
At the point where the train departed at Mill and Water streets, one of our country's earliest railroad passenger stations was erected and wholly completed by 1835. By January 1833, three years after the first stone was laid, six miles of the road was finally open for two round trips a day. The

driver, as it was then a horse-drawn road, received \$22.50 a month for which he covered twenty-four miles a day, took care of the horses, collected the fares, carried baggage, washed the cars and handled any mail.

On March 2, 1833, the Lexington and Ohio made a trial run with a locomotive designed by Thomas Harris Barlow, who was later to gain far greater fame as the inventor of the planetarium, a device to show the size, relationship and the motion of planets around the sun. Barlow's planetarium was unquestionably a more impressive invention than his locomotive, which stood only three and one-half feet high, resembled a peanut roaster more than a steam engine, and although it had flanged wheels, for some unexplained reason, it also had a set of tiller ropes and a pilot wheel for steering. On the rear of the platform, not much larger than a pocket flask, was the spare water container. It operated for seventeen days and then was replaced by a pair of far more dependable and more aesthetic appearing horses.

The directors, however, were apparently undaunted by the failure of the first Barlow and later built three slightly improved models called the *Nottaway*, *Daniel Boone*, and the *Logan*. These three are most notable in railroad history as invariably arriving behind schedule—sometimes days late.

By January 30, 1834, the line finally meandered its way to a hill top northeast of Frankfort. Here the cars were handled down a 2,200-foot, forty-degree incline by a stationary engine. Despite the fact that cab fare from the top of the incline into Frankfort cost twenty-five cents and the entire route from Lexington to Frankfort of twenty-eight miles cost, by contrast, only a dollar, most passengers paid the extra two-bits and refused to be conned onto what appeared to be a suicidal descent.



The South Carolina of 1832 was the first articulated locomotive. It was a 2-4-2 type and the engineer operated from a seat in the middle on top of the firebox. Frame was hinged to firebox; boiler was on rollers.

B&O

In January 1835, less than a year after the route had spanned the distance between the two cities, real tragedy struck the line. Youngsters had the bothersome habit of jumping onto the locomotive tender as it puffed through Lexington's streets. On the 23rd of the month, a youngster fell directly beneath the wheels and was crushed to death. On the return trip from Frankfort, one of the coaches jumped the track, one passenger was killed instantly and a score or more were seriously injured.

Meanwhile the stone sills supporting the flat iron rail had started to break up. Snake heads jabbing up through the floors of the equipment injured numerous passengers and kept the floors in a constant ventilated, splinter-fringed state. Between damage claims by passengers and repair bills to equipment, the line was very quickly in shaky financial condition and the slower but surer and safer stage route between the two cities commenced again to prosper.

RAILROADS OF NEW ENGLAND

In New England where the Gridley Bryant Granite Railroad had been opened at Quincy, Massachusetts, on October 7, 1826, over a three-mile long, horse powered broad gauge railroad created to transport granite for the building of the Bunker Hill

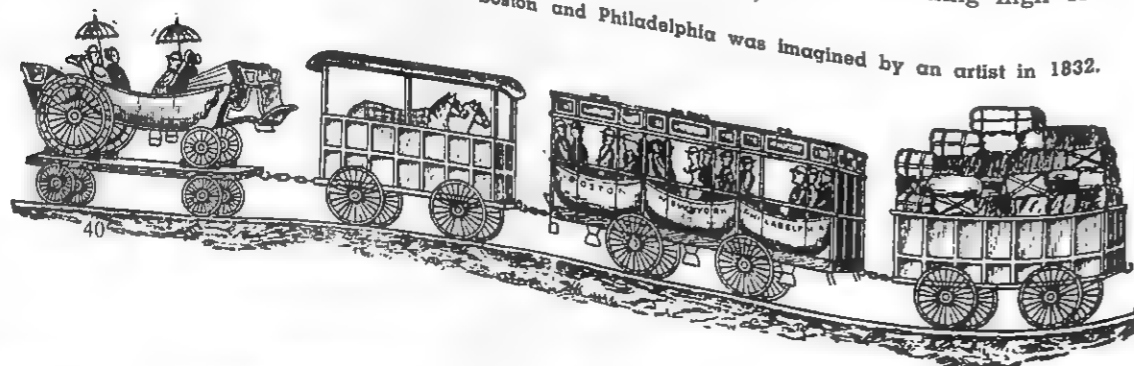
monument, commerce, too, had fallen off. Canals in New England proved a disappointment almost as quickly as they were completed, for they were short, expensive to build and winter ice took them out of business at least five months of the year. Boston looked longingly at what to her was the West, which in those days was Albany.

Boston's era of prosperity built on coastal traffic with Nova Scotia and European shipping, had been struck a hard blow by the War of 1812 blockades. The pattern had changed and the westward trek toward Ohio had begun. Baltimore was already tapping this western traffic as was Philadelphia so it was only natural that railroads should be looked to with favor and hope.

The nation's first Railway Exhibition was held in railroadless Boston, May 1827. One Bostonian viewing the display of English locomotive equipment seriously wanted a reversal of the setup—rails on the car and sled-like rollers on the ground. But all in all the exhibition was an eyeopener to the droves of curious people whose admission fees more than repaid the overseas entrepreneur for their freightage cost on equipment transported.

In 1830 the Boston and Lowell Railroad was chartered and twenty-six miles to Lowell was completed by 1834 with stone-age construction at a shocking high for

Ideal cars for an ideal train between Boston and Philadelphia was imagined by an artist in 1832.



The Mohawk and Hudson Railway used this building for their Schenectady railroad station in 1831. This company was later to become one of the lines to be incorporated into present New York Central RR.

NY Central

that period—\$55,000 a mile. Within three years after its completion, most of the granite-bedded road had to be reconstructed at an additional \$30,000 a mile.

The same mistake was made on the Boston and Worcester forty-four-mile route, which road in the spring of 1834 was the first in New England to shift from horse power to steam. It bought two English locomotives, the *Meteor* and the *Rocket*. Two trips daily were made from Washington Street, Boston, as far as Newton. One-way fare was 37½ cents, which was the going price of the shilling. Much later this became the bit piece in California at a value of 12½ cents so that the commonplace "two-bit" terminology in reference to a quarter can be traced back to the shilling.

Steam was used over the entire route into Worcester on July 3, 1835. The one-way fare over the full route was \$1.50, undercutting stage fees by 50 cents.

The Boston and Providence had been scheduled for a formal opening the day before the Boston and Worcester ceremony and although its lone locomotive failed to function and the event was somewhat dimmed, horse-drawn trains did make the trip. The opening of the Boston and Providence gave a faster route to New York than overland stage, for steamboats connected with the train at Providence. The

entire trip from Boston to New York by combination railroad and boat took sixteen hours, and even less once steam locomotives were used regularly on the line.

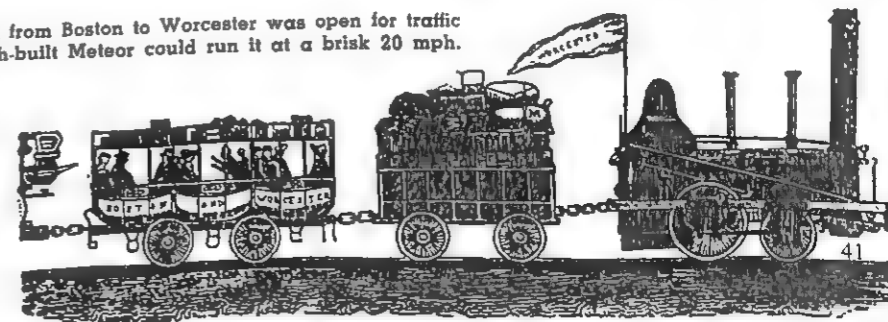
Part of the success of this high-speed transportation was due to the modernly fitted steamboat *Lexington* operated by Cornelius Vanderbilt. Travelers from Europe largely were impressed by the splendor of the combined transportation. One disgruntled British traveler, however, in reporting his trip over the route, stated, "The rich and the poor, the educated and the ignorant, are all herded together in this modern improvement in traveling and all for the sake of doing very uncomfortably in a day what could be done delightfully in eight or ten."

Perhaps these words were prophetic for on January 12, 1840, the *Lexington* caught fire and burned to the waterline with a loss of one hundred and twenty lives. The man, however, who built the *Lexington* and had centered his career around successful operation of ferry boats and later steamers, was to become one of railroading's dominant figures.

Cornelius Vanderbilt was a shrewd, swashbuckling individual possessed with a terrific will power and driving force. Although his principal interest was in transportation on the water, having started with

The 44-mile stretch from Boston to Worcester was open for traffic in 1835. The British-built *Meteor* could run it at a brisk 20 mph.

NY Central





Famous among American locomotives was DeWitt Clinton, first train to operate in the Hudson Valley from Albany to Schenectady, N. Y., August 13, 1831.



PRR

First American signal was ball raised on pole for "track clear ahead," hence term "highball." Here is first use on Delaware's New Castle & Frenchtown.

sailing vessels at sixteen and later parlayed a Staten Island to Manhattan ferry boat into a major fortune, Vanderbilt for many years steered shy of railroads. This is quite understandable, since on October 8, 1833, when on his first railroad trip over the Amboy and Bordentown road, Vanderbilt was a passenger on the train which was involved in America's first major railroading accident. Vanderbilt suffered sev-

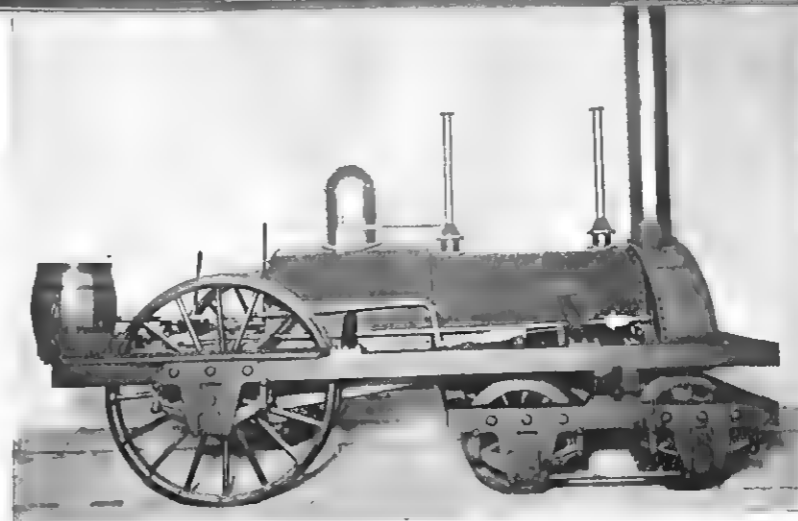
eral broken ribs, a punctured lung and very nearly lost his life in the severe, then-referred-to "concussion" in which a number of passengers were killed and several dozen very seriously injured. So it was not until the early 1840's that he subdued his early distrust of railroads and became a stockholder in the Long Island and Stonington Railroad.

THE MOHAWK & HUDSON

Yet as early as December 1825, George Featherstonhaugh, a Britisher by birth and an Upper New York Valley settler by choice, advertised his intention to file an application for the incorporation of the Mohawk and Hudson Rail Road Company, a pioneering line which was to become a part of the later New York Central which Vanderbilt was to dominate.

On April 17, 1826, a charter was finally granted to Featherstonhaugh and his fellow stockholders. The charter awarded by New York State, dominated by Erie Canal stockholder pressure, held scant appeal to the directors of the company, for two joker clauses made them hesitate to pursue their plan further. The first made the stockholders jointly, severally and personally liable for all debts contracted by the new corporation and its agents. The other clause would permit the state to take over the road any time within five years of its completion, annul the charter, and repay the corporation its expenses. It appeared that the state was thus willing to see a gamble taken with private funds and yet might well step in and take over the railroad should the venture prove to be a success.

The road was planned to span the distance between Albany and Schenectady, seventeen miles by stage, 15.875 miles by railroad as it was originally constructed, but forty miles and more than a day's journey by canal barge due to the necessity of following the winding Mohawk River,



B&O

twice crossing the stream and passing through several locks. It wasn't until the summer of 1830 that ground on the project was broken. Featherstonhaugh, the founder of the line and technically the father of the New York Central, had, more than a year before, resigned as one of the directors of the company due to friction with other members.

The company's first engineer, Peter Fleming, who surveyed the route and gave an estimate of \$275,000 for the completed road, had retired before actual work on the road began. John B. Jervis, of the Delaware and Hudson Canal and Railroad Company, was hired by the directors at a then surprisingly high salary of \$2,000 a year plus expenses for half of his time.

The exact date of the ground breaking is not known. It has been reported variously as early as July 27 and as late as August 12, but it is known that work began by September of 1830.

Jervis, having once experienced rapid decay of a short line on which the *Stourbridge Lion* ran the year before, used the stone-age approach with 15-inch cubes of stone on which were based timbers, topped by strap rail. At this time no decision had been made as to whether steam locomotives would be used on the road, so a horse path was constructed between the rails. Nearly a year was required to complete the roughly fifteen-and-a-half-mile distance.

The West Point Foundry, meanwhile, had been contacted and that New York City builder of the *Best Friend* and the West Point for the South Carolina Railroad created the famous *DeWitt Clinton* for the Mohawk and Hudson. The locomotive was slightly under 12 feet in length with four wooden, iron-capped, 48-inch driving wheels and, typical of the West Point Foundry and other locomotive manufacturers' products of that day, it had no cab, no signaling device, and no light. The lo-

Jervis Experiment, 1832, was the first American locomotive with a bogie or front truck attached to the frame by pin and bracket, working on rollers.


1834.

PACKET BOAT,



AND

Rail-Road



ARRANGEMENT.

A Packet BOAT will leave Schenectady daily, for Utica, Rochester and Buffalo, at

Half past 10 o'clock A. M. and

Half past 6 o'clock P. M.

PASSENGERS for the PACKETS will leave Albany by the CARS at 9 A. M. and 5 P. M.

These are the only Cars that run to the Packets.

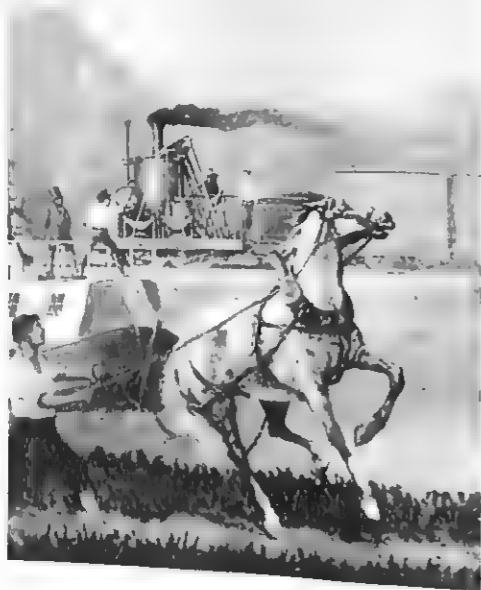
By this arrangement there is no delay, as the Packets will leave Schenectady immediately after the arrival of the Cars.

NY Central

The Mohawk & Hudson issued this poster in 1834. For many years rail and packet boat connections were maintained. Barges were for rougher travel.

comotive weighed slightly less than three and a half tons.

Contrary to many glowing accounts of the little locomotive, the first steamer on what was to become the New York Central, the *DeWitt Clinton*, was strictly a yard dog. In its first test, it was found that burning coal, it could not peak out at better than seven miles an hour. On its initial test over a slightly more than twelve-mile distance.



Chesapeake & Ohio Canal operators at one time got out injunction against B. & O. to stop scaring horses.
Herbert D. Stitt painting—B&O

it pathetically wheezed through the trip in one hour and forty-five minutes.

On August 13, 1831, the official opening jaunt from Albany to Schenectady took place. During the excursion, water flooded the cylinders, the draft and the smokestack were faultily designed and the forced draft rigged for the trip so that the DeWitt could burn coal, melted away part of the fire grate. Actually, two trips had been slated that day and horses had to be substituted for the ailing DeWitt on the second excursion.

The DeWitt was packed up and shipped back to the West Point Foundry. Early in September, the line's second locomotive arrived. This was an English-built, Stephenson engine, a six-and-a-half-ton four-wheeler with wooden wheels and iron tires—ungainly in appearance but fairly satisfactory in operation. The directors had at first planned to call it the Robert Fulton but its solid, chunky appearance and English heritage caused it to be dubbed the John Bull, sometimes confused with the other John Bull, the Camden and Amboy locomotive which was placed in service later in the same year.

By September 24, the little DeWitt Clinton was back from the Foundry with repairs and slight modifications. On that date the John Bull had been scheduled to take a group of political dignitaries to Schenectady. After several hours of delay due to a water line breakdown on the usually reliable Bull, the Clinton made the



trip pulling three cars in forty-six minutes, not too bad although the little pioneer still refused to function on a diet of hard coal and seemingly would work properly only with wood and the resultant belching exhaust of partially burned embers.

After a year of temperamental service, the original DeWitt Clinton was retired and in 1836 was scrapped and sold. The finding of one of its wheels sometime after 1890 led to the reconstruction of the exhibition replica, which has been seen by many thousands at Grand Central Station in New York or at railroad exhibitions to which it has been transported in recent years.

Until December 31st of 1831 the John Bull, occasionally spelled by the prima donna Clinton, averaged four to five hundred passengers a day over the route, with horse power being used intermittently when both of the steamers were under repair.

In 1833, Chief Engineer Jarvis left the Mohawk and Hudson to commence building the Saratoga and Schenectady Railroad. But prior to leaving, Jarvis designed his locomotive, Experiment, being dissatisfied with the rigidity, poor turning and inherent destructible characteristics of the English type four-wheeled engines. Jarvis' machine consisted of two forward trucks with only two driving wheels. The four forward wheels connected to the frame on a pivot. Cables, primitive looking, and scorned by English and American railroad locomotive



In a typical view of canal travel, horses pull a freight barge with a few passengers on the top. These did not offer luxurious appointments of packet boats, but were ridden sometimes to save time.

NY Central

builders of the day, the Jarvis-designed, West Point Foundry-built, Experiment, was America's and the world's first mile-a-minute locomotive.

David Matthew, who was the first engineer to operate the DeWitt Clinton and also the first to pilot the Experiment, wrote, "With this engine (the Experiment) I have crossed the Mohawk and Hudson Railroad from plane to plane, fourteen miles in thirteen minutes, making one stop for water. I have tried her speed upon the level, straight line, and have made one mile in forty-five seconds by the watch. She was the fastest and steadiest engine I have ever run or seen and she worked with the greatest of ease."

The "plane to plane" referred to by Matthew were the stationary engine cable operated, inclined planes, which hauled passengers from the Albany waterfront to the 200-foot plateau above the city and the lesser inclined plane at the Schenectady end.

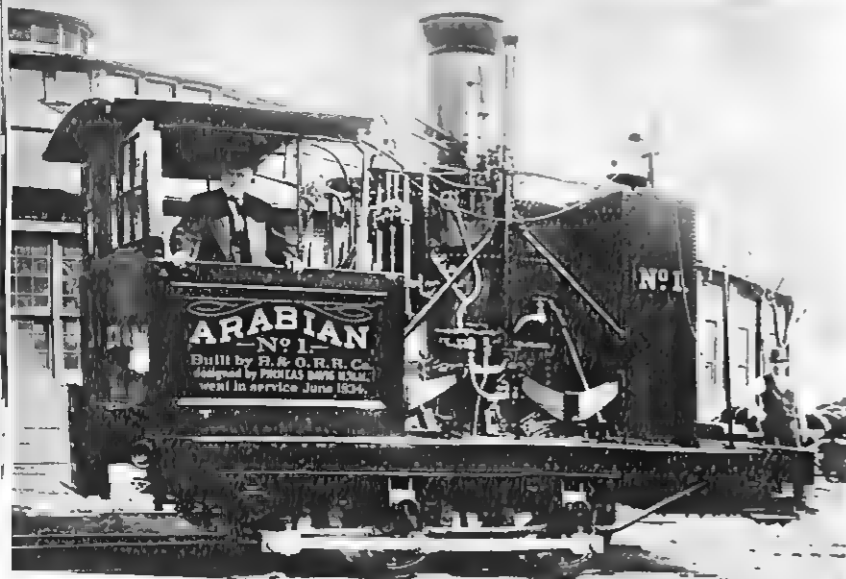
By 1834, the Mohawk and Hudson put two additional locomotives, the Hudson and the Mohawk, into service and had forty freight and passenger cars.

SHORT LINES OF THE 1830's

The second of the chain of short route lines, which eventually were to form the New York Central, was the Utica and Schenectady paralleling the Erie Canal for seventy-eight miles and incorporated April 29, 1833. While actual work on the Utica

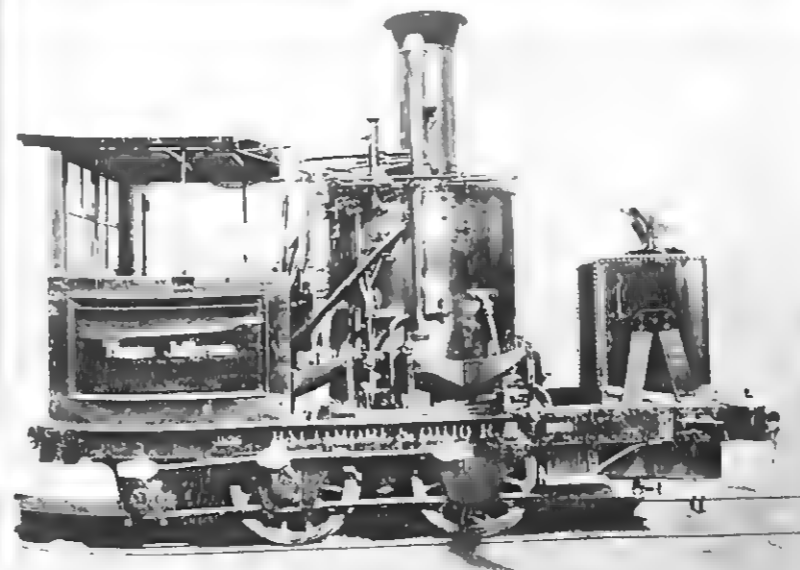
and Schenectady did not begin until September 1834, and the line was not completed until late summer of 1836, Jarvis went immediately to work in 1833 on a feeder line, the Saratoga and Schenectady which ran north from Schenectady through Ballston Spa to Saratoga. It is interesting that Jarvis moved out of stone-age construction and used wooden ties for the line. Since the little line could not afford to build a bridge across the Mohawk River, both horses and locomotives were used. Track was laid through an existing wooden bridge considered too weak to support a full locomotive-drawn train. Individual passenger cars at Schenectady would be towed one at a time by horses to the north bank of the river where they would then be coupled together as a brigade and the locomotive would take over.

Between 1830 and 1835 freight on canal routes was generally moved at three to four cents a mile. By 1835 the expenditure in constructing the Erie Canal, which included the initial four-foot water depth, increased by 1835 to a seven-foot depth, totalled \$108,000 a mile. Of the approximate 4500 miles of canals built throughout the entire United States, construction on the ditches averaged \$48,000 a mile. By contrast the Charleston to Hamburg, South Carolina, railroad cost less than \$6000 a mile. Admittedly this road was constructed over extremely flat terrain presenting no complicated nor expensive engineering difficulties. Yet the then-ex-



Phineas Davis, designer of the Arabian, also produced the York and the Atlantic, first of the grasshopper type locomotives, named for their driving action from rods to overhead beams.

B&O



President Jackson dismissed his cabinet to watch the first trains come into the station at the foot of Capitol Hill, Aug. 25, 1835. They were pulled by the Thomas Jefferson, the Washington, Adams, and Madison.

B&O

pensive Mohawk and Hudson cost only \$38,000 a mile and the average for railroads was well under \$28,000 a mile—impressively less than Erie costs.

Railroads, however, were not permitted in most instances by their charters to set their own tariffs, the tariffs being governed by the politicians, who usually placed them on a par with the fees charged by canals. Although the initial cost of the railroads' road bed was usually far cheaper than the canal waterway, upkeep and maintenance were considerably higher. Ties and stone piers had constantly to be replaced. Rails quickly disintegrated under the pounding of the crudely built locomotives. Although few of the northern canals were able to operate during the winter months, railroads, which had hope of making up deficits during the frozen-in monopoly period, found winter operating costs very high. While ice could not freeze in their equipment, snowbound trains were commonplace. In the unheated windowless rolling stock of pre-1835 vintage, a snowstorm was no joke. Winter travel by train was a real adventure.

Yet by 1835 steam railroads had established a growing and relatively strong network.

The New York and Harlem was chartered in April of 1831. By early 1833 it was operating horse-drawn cars on New York City streets, and by 1834, the city of some 250,000 population had rail transportation as far north as 88th Street on Manhattan Island.

The New York and Erie, forerunner of the Erie Railroad, which was involved in

more financial trickery, maneuvering, and swindles than any other major railroad in history, was not considered a threat to Erie Canal traffic and hence was issued a charter by the State of New York, April 24, 1832, permitting it to project its line from Lake Erie to the Atlantic seaboard tidewater at Jersey City. However, the State of New Jersey did not take the same happy view toward the line taken by the New York legislature and barred it from the state, so the newly incorporated railway had to be content, at least temporarily, with a beginning point at Piermont, New York, on the Hudson River, twenty-five miles north of the Jersey City termination point promised its early stockholders.

Work on the project began at Deposit, New York, by 1835, on what was not only the longest planned railroad in America at the time but also its widest. Its first president, Eleazar Lord, insisted on a 6-foot wide gauge when gauges on other roads at the time were largely a maximum of 4-feet, 8½ inches, the present standard gauge. Lord believed that traffic over the line would be so dense and the locomotives necessary. Probably a more important reason was that the original charter contained a stipulation that the New York and Erie must never connect with any other railroad leading to any other state and the 6-foot gauge effectively accomplished this. The idea was that the movement of traffic to the Port of New York through the southern tier of New York State would be controlled by an all-New York State railroad.

The area over which the Erie was planned was largely undeveloped. The largest town through which it was to pass was Elmira with a population at the time of the railroad company's incorporation of 3000.

At the outset it was estimated that the 394 miles of railway within New York State would cost \$6,000,000. Actually when the road was finally completed from Piermont on the Hudson to Dunkirk, Lake Erie, the cost was over \$20,000,000. A half a century later it cost the Erie \$25,000,000 to shift to the standard 4-foot, 8½-inch gauge, now America's standard.

The South, meanwhile, referred to in many histories as being backward, was extremely progressive in railroad pioneering. Surrounded by navigable waters and intersected by a network of navigable streams, the South had built cities on the banks and mouths of the rivers where at first they prospered by collecting and forwarding agricultural products and in turn distributing imported merchandise to the farms on the interior. Older cities along the seaboard and navigable rivers such as Charleston, Savannah, Richmond, Norfolk, Petersburg, and Wilmington, by 1825, were engaged in a commercial rivalry, all bidding against one another for new sources of supply and new markets for distribution.

Virginia sought to solve its problem with the James River and Kanawha Canal. Yet within two months after the South Carolina and Railroad Company was chartered in February 1828, Virginia followed suit with the Chesterfield Railroad Company, a ten-mile long road, running from the Chester-

field County coal mines to the tidewater of the James River opposite Richmond.

The Petersburg Railroad Company opened to rail traffic between Petersburg, Virginia, and Weldon, North Carolina, in 1833. The Portsmouth and Roanoke Railroad linked these two Virginia cities in 1835 and the Wilmington and Raleigh Railroad linked Weldon to Wilmington, North Carolina, the same year.

In the Tennessee River Valley a two-mile railway, the Tuscumbia Railway Company, joined the town of Tuscumbia to the Tennessee River in 1832. It promised such success that within days another charter was obtained for the Tuscumbia, Cortland and Decatur Railroad Company, which extended the railroad along the valley of the Tennessee River forty-three miles to Decatur to pick up river freight traffic interrupted by Muscle Shoals. This line was opened in 1834.

Not all of these new roads, however, flourished. For example, the LaGrange and Memphis Railroad Company was planned to link LaGrange, Tennessee, to the Mississippi at Memphis with the thought that it later would be extended to connect with the Tuscumbia, Cortland, and Decatur. After six miles of this line was built, the original company abandoned the project.

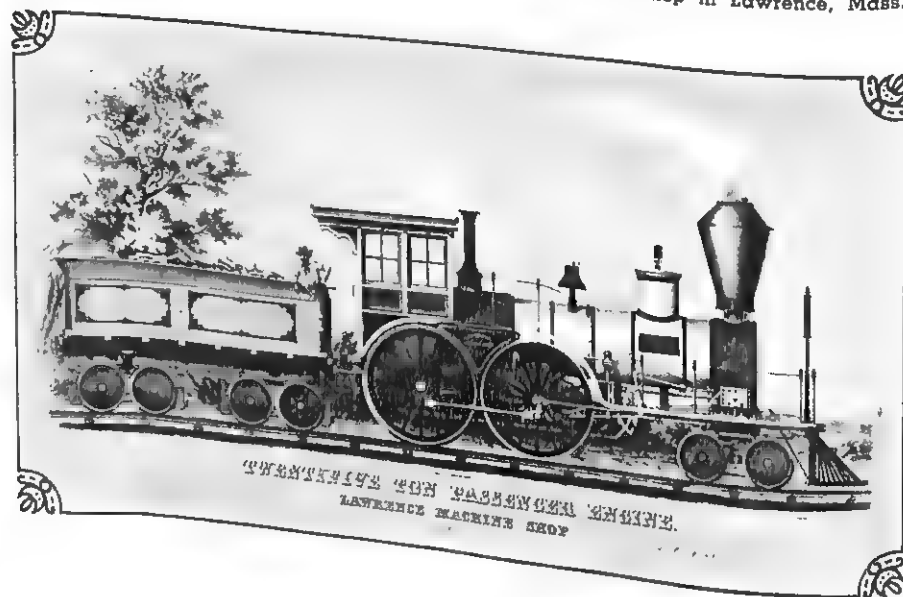
By 1835 the eastern seaboard was honeycombed with short railroads either already operating or at least under construction—a tremendous forward step from ten years before when America's only railroad was the 220-foot, circular, private Hoboken enterprise of Colonel John Stevens. •

JERK WATER LINES HEAD WEST



RAIL EXPANSION IS ACCOMPANIED BY FINANCIAL CONNING—TRAIN
TRAVEL BY UNCERTAINTY, CINDERS, AND ROUGH AND REAL ADVENTURE

The Lawrence, a 25-ton passenger engine, typifies the colorful and decorative appearance of the early locomotives. It was built before 1850 in a shop in Lawrence, Mass.
NY Central



FEW early railroad lines boasted water tanks along their right of way. The common practice by train crews on locomotives running low on water was to pull to a stop on a bridge or beside a stream. Leather buckets were heaved from the locomotives into the streams and water was jerked aboard. This water replenishing practice gave these lines their nickname and at that time the word "jerkwater" was more descriptive than disparaging.

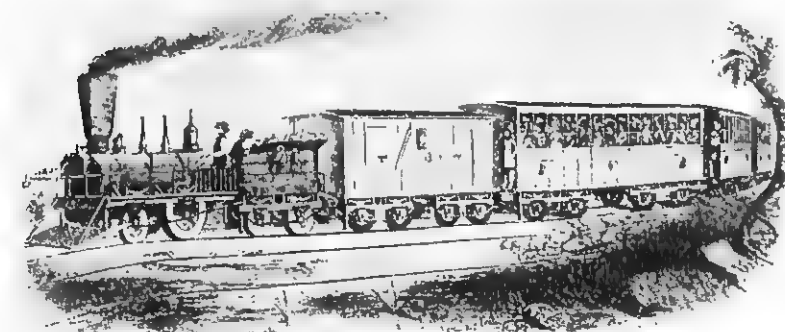
In 1836 the population of the United States was 15,127,000. That same year an estimated 1280 miles of jerkwater railroads were running—most of them with some form of steam power.

The steam engines were quite unpredictable and given on occasions to exploding. One reason for the prevalence of this unfortunate characteristic was the habit of tying down the safety valve in order to increase the power of the engines beyond the safe pressure expectancy of their designers. This calculated risk may have been fair enough for the engineers, but it was rough on passengers and also on the stockholders of the early lines who withstood plenty of lawsuits and exorbitant maintenance bills.

One early designer incorporated a tamper-in lead safety plug in his locomotive boilers. On one line on which these engines operated, a shop repairman, tired of constant plug replacements equipped the company's entire rolling stock with threaded iron plugs. The result nearly put the line out of business for good.

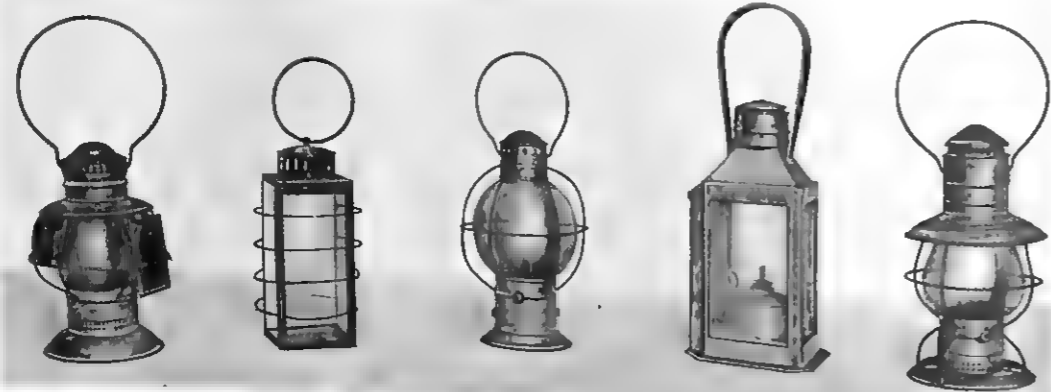
Inherent danger of another sort plagued the early roads. This was the pressure by worried canal groups that caused Congress in 1838 to request Levi Woodbury, then Secretary of the Treasury, to make a complete report on the use of steam locomotives in the United States and the accidents and loss of property and life which attended their use. Woodbury's report, presented in 1838, listed approximately three hundred and fifty steamers then in operation.

At least partially as a result of the Secretary of the Treasury's investigation, large glass water tubes were placed at the fire end of the locomotives' boilers as a hoped-for safety measure. Since the locomotives of the time were cabless, not only was the engineer exposed to the visual warning of a low water level but nervous passengers also kept their eye on the gauge and were quick to let the engineman know the minute the supply ran low. However, the *Samuel D. Ingham*, built by Eastwick and Harrison of Philadelphia, had a cab protection for the engineer and put a stop to backseat driving on the Beaver Meadow Railroad (now a part of the Lehigh Valley) at least on the water level issue.

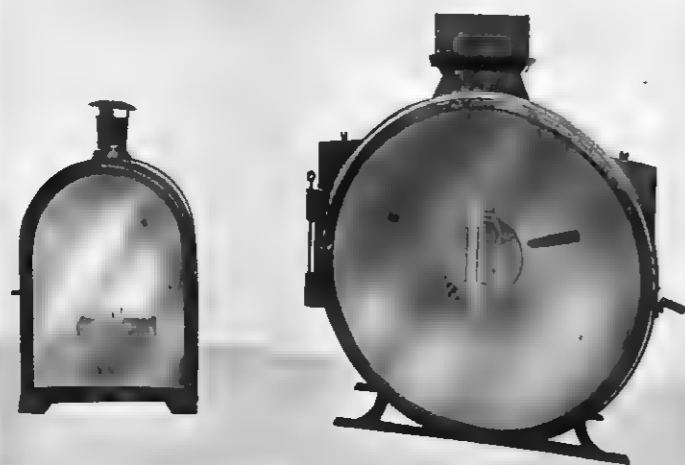


Erie

Early woodcut shows a New York and Erie wood burner with a capacity passenger load—merely the product of a stock manipulator's fertile imagination.



Above are early models of various types of trainmen's lanterns which were used on roads before 1850.



B&O photos

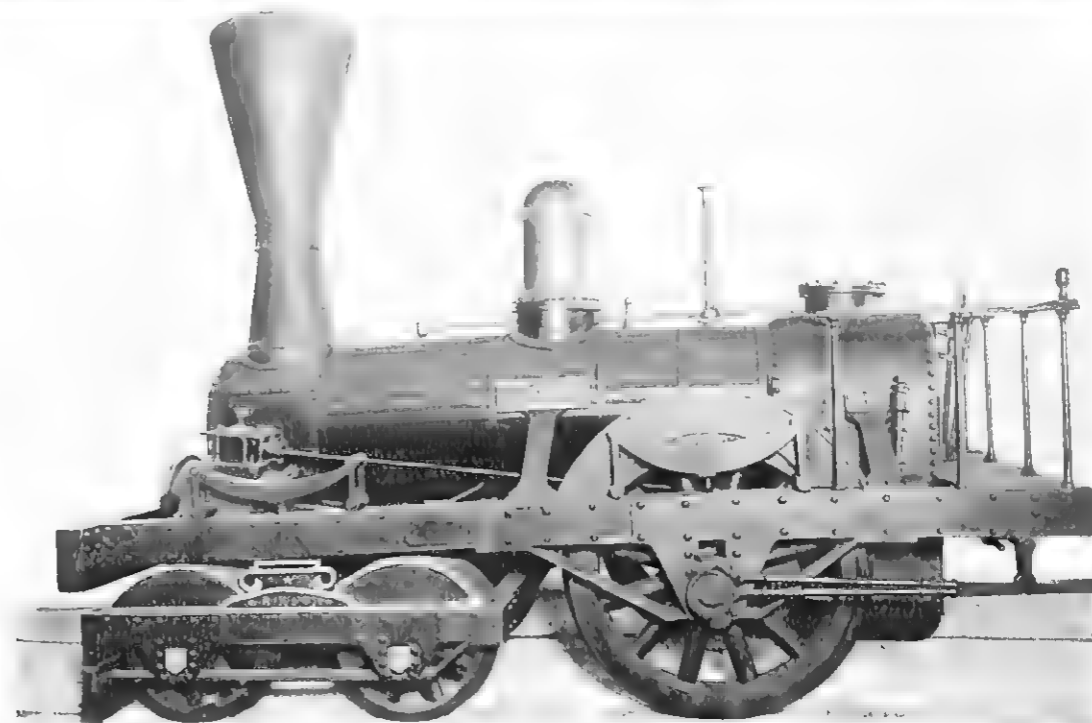
Early American locomotive headlights were better than Horatio Allen's bonfire car but still very primitive.

quehanna, a locomotive of the Wilmington and Susquehanna Railroad (now the Pennsylvania), and the Hicksville of the Long Island Railroad with steam whistles in 1836.

A more famous early locomotive equipped with a whistle was the *Sandusky* built by Rogers, Ketcham and Grosvenor of Paterson, New Jersey. This horizontal boilered locomotive, built in 1837, was to become the first locomotive in the State of Ohio, but its initial test was conducted between Paterson and New Brunswick, New Jersey, on the Paterson and Hudson River Railroad. The day the test was made, J. H. James, president of the Mad River and Lake Erie Railroad, to which the loco-

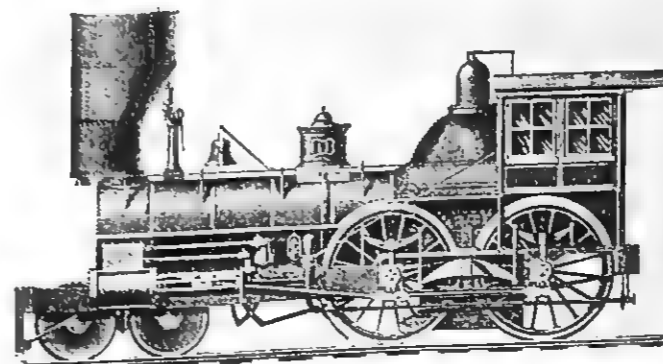
motive was consigned, was far more impressed by the signaling device than by the locomotive itself. In fact, he tooted the engine's warning signal so loudly and so frequently that the *Sandusky* ran out of steam on several occasions, wheezed to a stop and made rather a poor operational showing.

The *Sandusky* for some curious reason was equipped with wheels of cross tread designed for a 4-foot, 10-inch gauge track. On November 17, 1837, a month and three days after it had been disassembled, packed in boxes and shipped by water and overland by wagon, the \$6,750 *Sandusky* was giving its first demonstration ride to the Ohio citizens of the town bearing the same



B&O

In 1837 Rogers, Ketcham and Grosvenor of Paterson, N. J., built the *Sandusky* for first northern road chartered west of Alleghenies, the Mad River and Lake Erie.



Noah Vibbard was designed and built for Mohawk and Hudson Railroad in 1840. Note early spark arrester and cinder chute forward. Steam whistle, bell are features.

NY Central

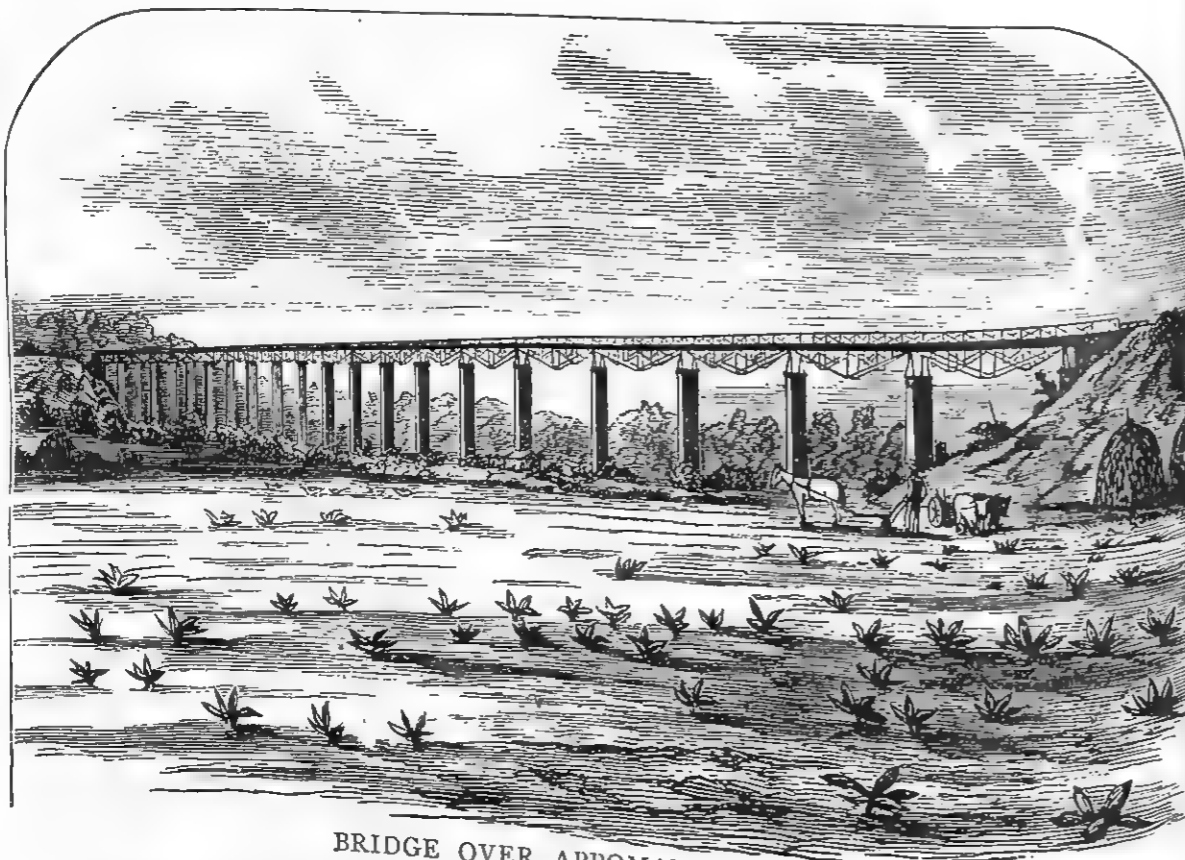
name on a short three hundred foot stretch of track designed for the locomotive. Because of the enthusiasm evidenced at the *Sandusky's* initial Ohio run, the engine's 4-foot, 10-inch gauge was voted by the State Legislature to be the standard for the state. The 4-ft., 8½-in. English gauge, which was arrived at by Stephenson after taking a survey of varying wagon cross treads, had been adopted by many of the American eastern lines which used English-built locomotives.

While a standard whistle code, based on short and long blasts, was not to come into general acceptance until about 1870, so a standardization of rail gauges was also to be a long time arriving and the melange

of various width tracks led to no end of arguments and confusion. In the instance of the 6-ft. broad-gauge Erie, stubborn refusal to make a change nearly led to the line's complete failure.

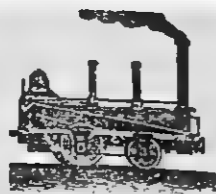
SHORT LINES WITH SHORT LIVES

By the late 1830's when the New York and Harlem River Railroad had been extended to a full eight miles at a cost of \$1,100,000 to make it the most expensive piece of railroad property in the United States, many other railroads chartered in the first half of 1830 had already folded due to the financial panic of 1837. This, on top of the great New York fire of December 16, 1835, left a large nucleus of formerly wealthy sea-



BRIDGE OVER APPOMATTOX RIVER.

N&W



CITY POINT RAIL ROAD.

THIS Road will be in operation to-morrow the 7th inst., for the accommodation of passengers. The following arrangements will be observed until further notice.

A passenger train will leave Petersburg every day a quarter before 8 o'clock, A. M. and arrive at City Point in time for the Richmond Boat for Norfolk and Baltimore, and at 3 o'clock, P. M.

Leave City Point at 12 o'clock, M., or as soon thereafter as the Norfolk Boat arrives, and at 5 1-2 o'clock, P. M.

N. B. In a few days arrangements will be made for the transportation of Freight, of which due notice will be given.

G. CLARK,
Superintendent.

Obstacle on Virginia's Southside Railroad project was 100 ft. deep by 3,400 ft. wide slice in earth cut by Appomattox River which had to be bridged.

On September 7, 1838, the first train operated from Petersburg 8.7 miles to City Point in Virginia to mark the start of the Norfolk and Western Railway.

board Americans in a state of financial ruin.

In the South, ambitious plans were laid to tie the coastal cities to the West with the Louisville, Cincinnati and Charleston R. R., which through factional disputes joggled into being the Hiwasee R. R. and the Western and Atlantic, all three of which flopped.

Although England in 1838 built Euston Station in London as the world's first large railroad terminal, receiving and dispatching nine trains daily, America had already outstripped England with nearly 2,000 miles of railroad lines that year as opposed to 1,300 in Great Britain.

Minor but none the less important prob-

PIONEER

FAST LINE.



BY RAIL ROAD CARS AND CANAL PACKETS.

From Philadelphia to Pittsburgh,

THROUGH IN 3! DAYS!

AND BY STEAM BOATS, CARRYING THE UNITED STATES MAIL.

From PITTSBURGH to LOUISVILLE.



Starts every morning, from the corner of Broad & Race St.

In large and splendid night wheel men, on the Lancaster and Maryland Rail Roads, arriving at the latter place at 4 o'clock, in the afternoon, when passengers will take the Pacific, which leaves at 5 o'clock, and on the New Canal, and are on the water by the State and have any other Line.

The boats are commanded by old and experienced Captains, several of whom have been connected with the Line for the past ten years. For speed and comfort, this Line is not equalled by any other in the United States.

Passengers for Cincinnati, Louisville, Natchez, Nashville, St. Louis, &c.

Will always be ready to take them on without delay, at this Line connects with the State at Pittsburgh, carrying the Mail.

OFFICE, N. E. CORNER OF FOURTH AND CHESTNUT ST.

For more apply to agents and at the 100 Market Street, at the White Horse Hotel, Race Street, at the N. E. corner of Third and Walnut Streets, No. 21 South Third Street, and at the West Chester House, Broad Street.

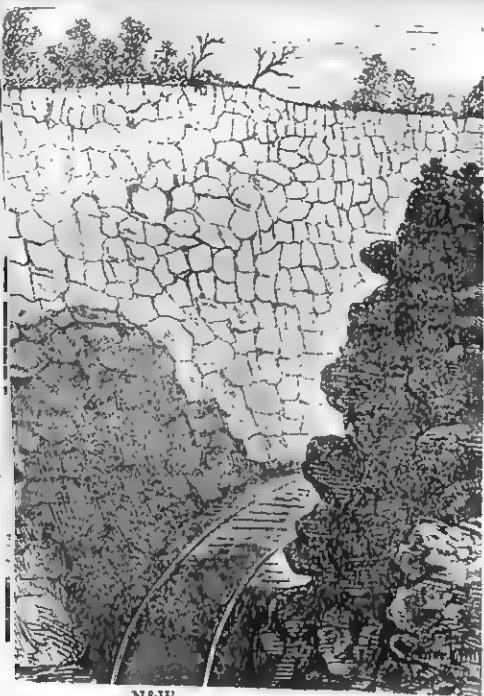
J. B. CUMMINGS, Agent.

NY Central

Part of the route of the Virginia and Tennessee went through fairly level terrain skirting mountains.

N&W





N&W

Deep mountain cuts were slashed through bedrock with hand tools and black powder. Dynamite was unknown until 1866. Cut was near Lynchburg, Va.

Railroad construction in 1845, as shown in drawing below, depended on large teams of workers equipped with crude tools. Note Indians at right.



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land and Virginia, and the Smokies of the Carolinas, which formed the Appalachian Mountain barrier to westward travel. An understanding of the full scale of complications presented can be gained by a review of the transportation problems existing in bridging the gap from Philadelphia to Pittsburgh.

In 1834 this route, which had taken eight years to build, operated in this fashion. From Philadelphia passengers left the city either on the horse-drawn cars of the Philadelphia and Columbia Railroad or by barge or packet over the privately owned Union Canal. On the Philadelphia and Columbia, a 2805-foot long incline operated by stationary steam engine was injected into the route. From Columbia all traffic as far as Hollidaysburg was by canal boat and one hundred and eight locks were required to reach that point where the Allegheny Portage began. The distance from Hollidaysburg to Johnstown over the Allegheny Portage was described in the last chapter. At Johnstown canal boats took over the final 104-mile leg into Pittsburgh, making the entire route cumbersome, slow, sometimes dangerous, but still far better than wagon or stage.

By 1840 even the staunchest advocates of canal systems realized that investments in the inland waterways were frequently highly speculative. The Chesapeake and Ohio Canal, for example, blandly started out to top the 2750-foot high mountain chain which separated it from the Ohio border. \$11,000,000 was sunk into this waterway which was finally abandoned in

1850 when it never got beyond Cumberland, Maryland.

It has been estimated that by 1840 a quarter of a billion dollars had been dumped into the vast chain of American canals that had sprung up during the canal fever decades.

Railroad building was a tough profession. It was the job of the railway contractor not only to survey means of piercing hills, bridging streams, crossing valleys and constructing way stations which called for him to be a bridge builder, road maker and practical mechanic, but he was frequently forced to direct his work with unskilled workers, many of whom did not even speak his tongue. The contractor was called upon to transport men, tools, provisions and to supply housing for veritable armies of men. He had the responsibilities of a general but unfortunately he wasn't vested with a general's control over his men, so that club-like fists and willingness to use the hardships confronting them, pioneer builders, frequently with no previous experience in construction work or in handling large groups of laborers, continued to plug away at bridging the mountain barriers to the west and crossing the plains beyond.

CHICAGO—SMALL TOWN RAIL CENTER

On January 16, 1836, Chicago was an unpromising town of 3,000 population. Its potentials seemed limited. To the west, north and south were undeveloped stretches of prairies, forests and swamps. To the east



C&NW

In 1850 both the Galena and the Burlington used Chicago's Canal Street depot. This group of immigrants heading west arrived at the station by Parmales Stage. Depot had been completed previous year.

lay the sprawling village's hope for expansion. And this hope was based on the founders' knowledge of the steam railways.

In the railroads rested their gamble that the month-or-more overland journey on the rutted and frequently mud bogged roads, or by boats across the Great Lakes to Buffalo, could be shortened. Galena, Illinois, was Chicago's other link in this hope, for in this Rock River Valley community to the northwest was a lead mining center that needed only adequate transportation to be promoted into vast wealth by diverting its trade from the Mississippi to Chicago. While lightly loaded wagons could make the Galena to Chicago trek in two weeks, the same wagons, if loaded with lead, would have bogged down hopelessly within a day from their starting point on the cart track trails of that period.

Rails seemed to be the obvious answer and so on January 16, 1836, a charter was granted for the Galena and Chicago Union Railroad by the Illinois Legislature. But even the line's original promoters were a trifle skeptical about the ultimate success of the line, for they asked and were granted a clause in the charter which would permit an improved turnpike road to Galena with toll gate privileges should their project fail.

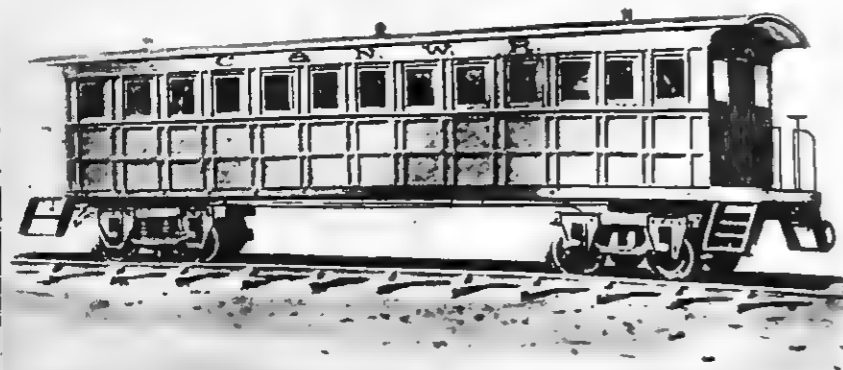
Charters are not railroads, which became all too apparent when economic panic swept the country in 1837 and depleted the Midwest of what little cash it contained.

William Butler Ogden, transplanted New Yorker and Chicago's first mayor, had spearheaded the plan for the Galena rail-

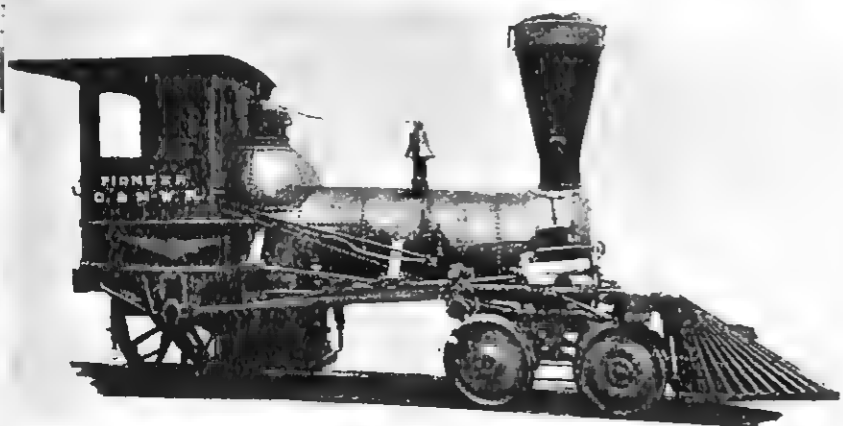
road and refused to give up his idea. The town of Galena, named for the blue-gray colored ore deposit, was situated on the Galena River a few miles from the Mississippi. The population of Galena and the wheat growing section of the Rock River Valley to the southeast were hard hit, like the rest of the country, by the twin business panics of 1837 and 1839 which were in essence one long five-year depression period from 1837 through 1842. The business panic was quite simply chargeable to over-speculation in public lands and to the rapidly growing but largely unprofitable canals. The two had gone hand in hand. States as well as private individuals had over-reached themselves in their investments. The people of the Midwest, of course, weren't as hard hit in general as the Easterners simply because there was less wealth in the Midwest. But unlike most other early midwestern roads, the Galena and Chicago Union wasn't backed by eastern financiers but rather its stock was held by small farmers and merchants who had faith in Ogden's promotional claims for its future.

As a result the settlers who had subscribed for but hadn't paid for their stock were so preoccupied with the hard task of survival that it wasn't until 1845 and a gradual ebbing of monetary distress that a new breath of life was blown into the railroad project.

In 1847 construction began. Chicago businessmen and farmers of the Northwest again were canvassed for funds. Some paid with cash; others with grain, promises of



First railway coach on the Galena and Chicago Union Railroad was this 8-wheeler. It has been restored for display by C&NW.



C&NW photos

First locomotive to operate out of Chicago (1848) was Pioneer, a wood burner which ran over the 10-mile Galena and Chicago Union.

grain, lead or timber. Cash amounting to \$352,000 and salable produce was finally raised largely from these farmer stockholders. Surveyor R. P. Morgan was brought in from the Hudson River Railroad at \$2.50 a day. The original railroad ties, which had been laid on Chicago's Madison Street, had long since rotted away. New ties were laid, strap iron rail was spiked to wood stringers and in 1848 the directors authorized the purchase of a locomotive, three passenger cars and thirteen freight cars.

The locomotive was the *Alert*, a third-hand engine originally operated on the Utica and Schenectady Railroad and bought by the Galena and Chicago Union from its second owner, the Michigan Central. Renamed the *Pioneer*, the ten-ton Baldwin-built locomotive was already eleven years old when sailors and long-shoremen struggled to drag the iron monster ashore from the brig "Buffalo" in October of 1848. On October the 25th, *Pioneer*, with a small group of town dignitaries and the line's directors seated on a flat bed freight car behind it, chugged five

miles west of town and back to introduce railroading to Chicago, the city of little promise which grew to be America's greatest rail center.

Chicago's first passenger station was a one story wooden structure built at Kinzie and Canal Streets in 1848. The next year a second story was added and by 1850, when a tower was tacked on to the second story, the Galena and Chicago Union had extended forty-three miles to the northwest.

The tower, by the way, wasn't added for decorative effect. President of the line, William Ogden, took up a post in the tower when trains were due and with a marine telescope was able to spot incoming trains five miles or more out on the prairies. From his lofty directorship, he shouted advance train information to the passengers on the platform below.

On December 15, 1848, a passenger boarding the train at the DesPlaines River Junction ten miles west of Chicago persuaded its conductor, or train captain as to bring along a load of cowhides and fur pelts. This was the first freight hauled on

Chicago's first railroad station was located at Kinzie and Canal Streets. It served the Galena and Chicago Union Railroad, the first link of today's C&NW road.



Railroad materials were hauled to the west from the east by freight outfits called "jerk lines." One shown here with 14 mules was called "jerk line fourteen."



Burlington

the line and the first railroad freight ever to be brought into Chicago. Before the end of the year, the line's directors were overjoyed to discover that farmers had started to bring their wheat as far as the line's western terminus and wheat hauling was bringing in a revenue of \$15 a day.

The little *Pioneer* was soon joined by additional locomotives so that by 1850 there were enough engines in the company to permit lease of the *Pioneer* to the Burlington Road, which had started building from Aurora eastward and was to use the Galena's tracks from West Chicago into the city and also use the Kinzie Street depot. Thus a strange occurrence in a competitive transportation set-up came about when Chicago's first two railroads shared the city's first locomotive, first set of tracks and first railway station.

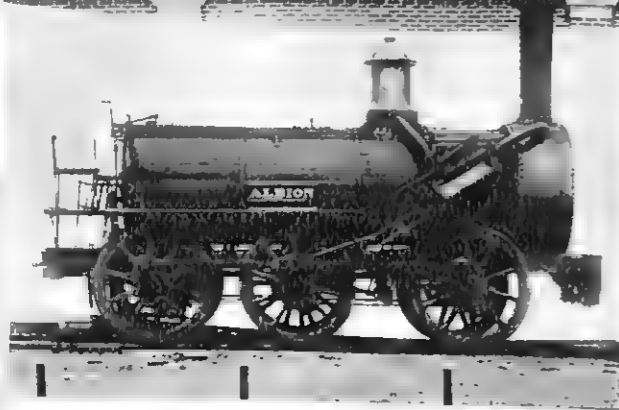
That year the little Galena line's financial report showed gross receipts of \$48,331 of which \$29,812 were net profit! And that whopping high percentage was achieved with cord wood fuel costing \$2.13 a cord.

The little road carrying the name Galena and Chicago Union strangely enough never

did pass through Galena and some years later when it merged with the Chicago and North Western Railroad Company, the latter's name was retained.

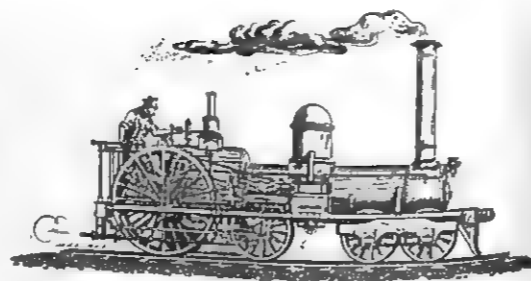
RAIL SCHEMES FOR ILLINOIS

Although rail travel to and from Chicago was not established until 1848, agitation for a railroad in Illinois began in 1831. James Buckland, chief engineer of the long-contemplated Illinois and Michigan Canal, had the foresight to survey two routes, one for a canal which he estimated would cost \$100,000 a mile and another for a railroad for which he figured \$25,000 a mile would turn the trick. In fact, Buckland's enthusiasm for the canal project quickly waned. After going east to confer with the engineers of the Baltimore and Ohio Railroad, and check over the snail-like progress of the Chesapeake and Ohio Canal, he returned to Illinois, urged abandonment of the projected canal in favor of a railroad. Such was the persuasiveness of his arguments, that even the canal commissioners and the state's Governor Reynolds agreed. On their recom-



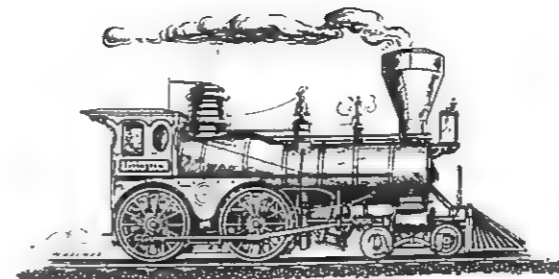
B&O

The Albion was among a few English built 0-6-0's sent to America between 1838 and 1845. This ran on the Albion Coal and Iron Co. RR, Nova Scotia.

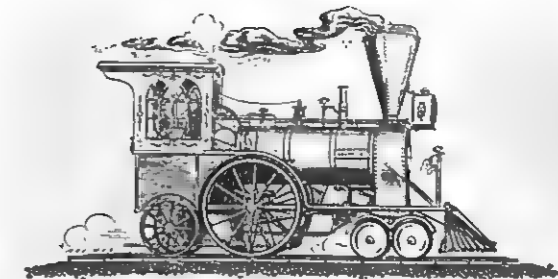


NY Central

Speed demon of the Utica and Schenectady Railroad was the express locomotive Lightning. It hauled eight cars 16 miles in 13 min. and 21 sec.

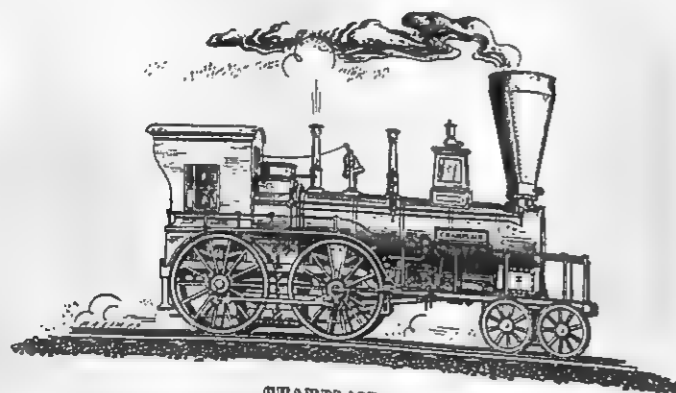


Built in 1852, the Irvington was the first locomotive burning coal to be used on the Hudson River Railroad. Wood and coal burners ran simultaneously.



NY Central

The Brookline, built in Liverpool in the late 30's, ran up more miles by 1853 than any other locomotive in U. S. It operated on Boston and Worcester.



CHAMPLAIN - 1840

NY Central

One of the six original locomotives on the Hudson River Railroad was the Champlain, operating between New York and East Albany. Passengers crossed to Albany in ferry boats.



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As late as 1845 a group of pioneering midwestern railroads were still very dependent on animal power.

mendment in 1833, the Illinois Legislature authorized the change in plan and issued a rail charter.

However, a change of politics brought in Governor Duncan, who viewed railroad maintenance costs with suspicion and prevailed upon the legislature to abandon the railway project and start construction of the canal. Actually the canal was completed in 1848 linking Chicago with the Illinois and Mississippi Rivers.

Another early rail exponent was Alexander M. Jenkins, who, in 1832, as Speaker of the Illinois House of Representatives, proposed a 300-mile long railroad from what today is Cairo, Illinois, to connect with the western end of the proposed Illinois and Michigan Canal. In 1836 a bill was passed chartering the Illinois Central Railroad Company and in 1837 the State

Legislature passed an Internal Improvement Act which provided for a network of 1300 miles of state owned railroads to reach all parts of Illinois except the northeast section which was to be served by the canal. In so doing, the state committed itself to a debt of \$20,000,000—overwhelmed when it is considered that this represented more than \$250 for every family then settled in the state.

By 1840 Illinois had spent \$14,000,000 of this sum and had only a piddling 24 miles of completed railroad to show for its expenditure. This line, part of what was called the Northern Cross Project, extended from Meredosia on the Illinois River to Jacksonville.

The first locomotive built for an Illinois railroad was shipped from the east by water and somewhere en route disappeared. No

record of the lost locomotive has ever been found.

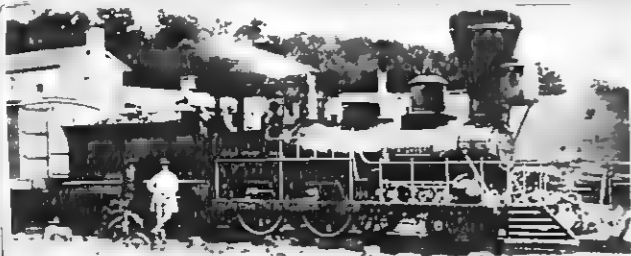
That same year the locomotive *Rogers*, built by Rogers, Ketcham and Grosvenor of Paterson, New Jersey, arrived safely by water, having been shipped from New York to New Orleans, then up the Mississippi and Illinois Rivers to Meredosia. Its first run was made on November 8, 1838. Regular service did not begin over a twelve-mile section from Meredosia to Morgan City until July 18, 1839.

By 1840 it had doubled its mileage through to Jackson and there construction stopped for several years due to the breakdown of the Illinois Improvement program.

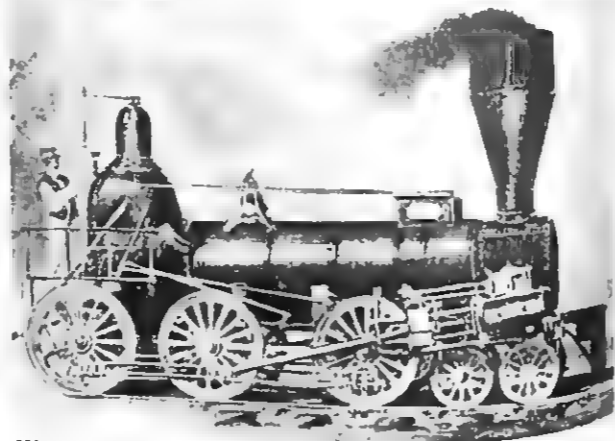
Although the first in Illinois to maintain a regular schedule, the Northern Cross Railroad, which in 1842 was extended through to Springfield an additional 33½-

miles, was not a public success. The road bed was so shaky and poorly built and the tiny 4-2-0 locomotive *Rogers* with its two driving wheels only 24-inches in diameter so poorly designed that the locomotive spent almost as much time derailed or upside down in ditches as it did on the track. Unlike the eastern roads such as the B. & O. which started with animal power and early in the thirties switched to steam, the Northern Cross started with steam and by 1845 abandoned its lone locomotive for mules.

When the Northern Cross switched from locomotives to mules, Illinois, after spending more than \$14,000,000, found itself right back where it started, entirely dependent on animal power for overland transportation. In 1847 the Northern Cross Railroad which alone had cost the state \$1,000,000 was sold at auction for \$21,500.



N&W
First locomotive to run on the Virginia and Tennessee Railroad from Lynchburg, Va., to Bristol, Tenn., was the Roanoke. Historic run was made in 1856.



N&W
The George Washington, a Norris-built 14,400 pound locomotive, was a 4-6-0 used on the City Point Railroad in Virginia. It was used during 1838.

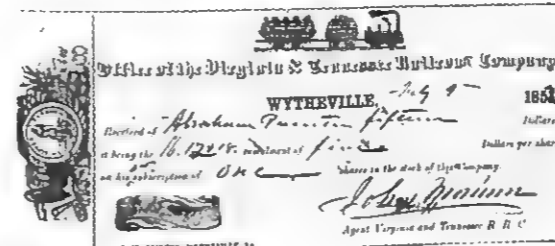
The West Feliciana was an early Mississippi Valley road, chartered right after the 1837 panic. It ran from Yabou Sara, La., to depot at Woodville, Miss.

today part of the Central Railroad of Georgia, was behind-the-scenes political maneuvering to obstruct development of the state-owned Western and Atlantic from Atlanta to Chattanooga and to prevent Macon from securing state aid for rival projects. Annual reports of the line, however, contain facts of interest concerning railroad operation in general. For example, in 1840 when only a part of the line was operating, the average train speed was by an edict of the Board of Directors reduced from 22 miles an hour to 17.4 miles per hour, thus effecting an economy both in maintenance of the roadbed, rolling stock and fuel consumption.

A problem still argued today confronted the Central Railroad and Banking Company in 1841 when certain members of the Board of Directors contended that a reduction in freight and passenger rates would increase business and thereby increase net revenue. The theory was tested for a year and resulted in a heavy decrease of the net.

While bookkeeping and statistics on many roads were somewhat lax, the bank training of the officers of the Central Georgia gives us figures today from their records which reflect cost of the time. Fuel performance of the 4-4-0 locomotives in 1842 was 75.21 engine miles per cord of wood, which sounds like pretty terrific mileage. The average expense to operate their trains, both freight and passenger, was 69.26-cents per mile including salaries of the engineer, firemen and conductor.

RAIL "BANKERS" OF OHIO
Banking privileges offered railroads



N&W
Railroad stock was often bought in installments.



N&W
This bond coupon issued by the Norfolk and Petersburg was good but many new companies later defaulted.

were to haunt state legislatures granting them for years to come. Back in 1829 a civil engineer, Colonel Clinton, tried to promote funds to build a railway to be called the Great Western, which was to run from New York all the way to the Mississippi—this at a time when Pennsylvania had forty-seven miles of railroad, the longest of which was only thirteen miles; Maryland had thirteen; and South Carolina, six. The man was considered completely mad, particularly when he gave a figure of \$15,000,000 for the project. Another would-be railroad entrepreneur was thought even balmier when he offered to form a company guaranteeing to cover the same distance for \$1,000,000 or less than \$900 a mile including the purchase of the right of way. The construction this promoter suggested was what has been referred to as the post-and-plank railroad, on which the bed consisted of pilings, 10-feet apart, topped by 9-inch by 3-inch planks set on edge. No iron of any sort was to protect this and such construction would have been fortunate to have stood up under continued use by an empty sulky.

Even the untried railroad engineers of 1830 knew that this latter proposal was tainted with skulduggery. But not so Ohio's promoters who were going crazy building canals and decided also to add to their transportation daffiness by taking a fling at railroading. The post-and-plank proposition was dragged out of mothballs and under the name of the Ohio Railroad, was planned to range along Lake Erie from the Pennsylvania line to the Maumee River near Toledo.

A charter was granted for the line in 1836

OFFICE OF THE VA. AND TEEN. **R. R. Company.**

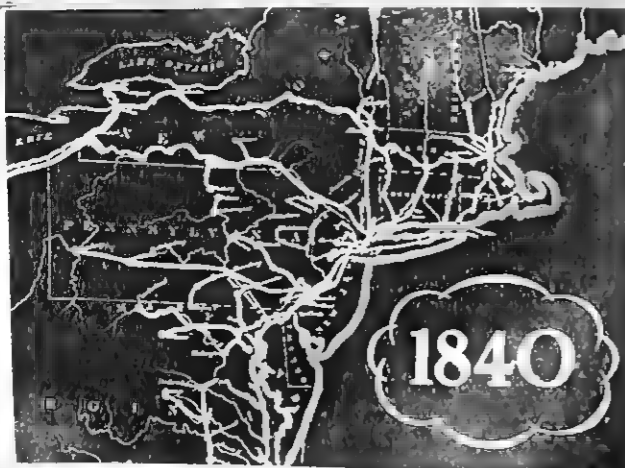
Lynchburg, March 6, 1852.
The board of Directos of this Company have ordered a requisition of five dollars per share upon all the stock which has been subscribed, payable on the 15th day of April next, being the 21st upon the old, & 13th upon the new subscribers—and a further requisition of Five dollars per share, payable on the 1st May next, being the 22nd upon the old subscribers and 14th upon the new.

Delinquents will be required to pay interest in all cases. F.G. MORISON.
March 13, 1852.

Stockholders were constantly being assessed to cover underestimates of construction costs.

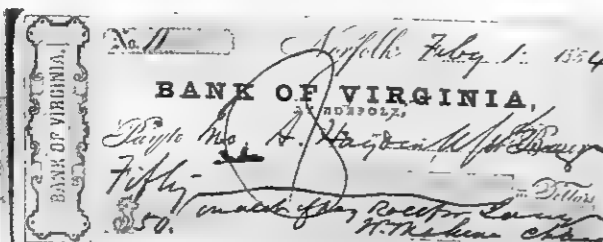
and with it also went banking privileges. The Ohio Railroad wasn't too nifty construction-wise but it certainly kept its printing presses busy. Within a year it ground out \$400,000 worth of paper money, about as valuable as wampum at that date.

In 1837, with the panic on, and the few Eastern financiers who hadn't already lost their shirts being reduced at least to frayed cuffs, Ohio chartered twelve more railroads. When the new companies were unable to sell their stock either to the influx of German immigrants who had headed toward mid-America because of revolutionary movements convulsing Europe, or to English capitalists, who were caught between the dual burdens of increased taxes for past wars lost and new wars to come. Ohio Legislature turned to what was to become known as the "Plunder Law." This was a sort of lamp rubbing visionary scheme that backfired. It permitted railroad (and also turnpike and canal) corporations to borrow money from the state to the extent of 50 per cent of the paid up company's capitalization. What actually happened was that companies were chartered, land obtained, sometimes as cheaply as 25 cents an acre (since destitute Ohio farmers were deserting the area and trekking west) and the companies would then present deeds for this right-of-way property placing on it the companies' own well-watered valuation. Thus certain companies would invest \$5,000 to \$10,000 in land, self assess the property at ten to twenty times the purchase price, and then borrow half of that phony evaluation from the state. On paper it was possible for a railroad to charter itself for \$500,000 in capital stock.



AT&SF

By 1840 the network of rails had spread from New England and Middle Atlantic States to Lake Erie.



N&W

None of the fabulous fortunes made in railroading during the mid-19th century leaked down to the engineers. Pay check of \$50 per month was common.

spend about \$2,000 in cash for land, claim the property value to be \$200,000 and get \$100,000 in bonds from the state. What happened, of course, if the line was never built was the state's problem.

Only one joker confronted the phony promoters. With the panic still going on in 1839, the state bonds weren't too readily converted into cash. When they met this obstacle, the banking privilege clause in their charters was put into effect and with most of these chartered lines in '38 and '39, there was more clacking of the printing presses than ringing of hammers on spikes.

The Ohio Railroad Company at least made a try at building a road. It started construction at Freemont in 1839, about twelve miles inland from Sandusky Bay. The post and plank method, plus stringers linking together the pilings and strap iron topping the wooden edge rail was used. The road was to be a double tracked affair so four parallel lanes of pilings spaced at 10-foot intervals were driven. The goal was Cleveland, about sixty miles away. When less than twenty miles of pilings and wood framework had been placed at the end of two years and the laborers as well as the contractors and all of the various suppliers paid in script, the line petered out and was finally abandoned in 1843.

While the eastern lines continued to head west from Boston, New York, Philadelphia, Baltimore, Charleston and Savannah, the Ohioans strove to create a link to the East. In 1848 the Cleveland, Painesville and Ashtabula Railroad was chartered. Its line was to follow a route used by livestock raisers in driving beef cattle and hogs eastward along the lakes through Erie and on to Buffalo.

By 1850 aggressive railroad promoters had milked Cleveland so dry of ready cash that other local industry was set back for want of capital. Construction was under way by the half century.

EAST COAST LINES EXPAND

Meanwhile in New York State the nucleus of what was to become the present-day New York Central System, which has 10,735 miles of railroad line and 24,135 miles of trackage serving eleven states and two provinces of Canada, was rapidly developing from the tiny 17-mile long pioneer link, the Mohawk and Hudson Railroad opened in 1831. In 1836, public demand and financial support brought into being the Schenectady and Utica's 77-mile link, which for eight years was permitted to carry only passengers and their personal baggage. In 1844, the Erie Canal-minded State Legislature grandiosely permitted the line to carry freight in winter when the canal was frozen solid. Not until 1847 was permission granted to carry freight throughout the entire year and then only on condition that the Schenectady and Utica pay the state a royalty in the same amount per mile for freight carried as the state-owned waterway would have earned for this same service. Thus, it compelled the railroad to make its profit the differential in operational costs between water and steam.

That same legislature placed the same restriction on all railroads operating within thirty miles of the Erie Canal and these restrictions were maintained until 1851. This careful protection of the state's interest in its canal may explain why the Erie, despite its tremendous cost, flourished when other canal projects failed. With the abolishing of tolls on the canal in 1882, it had shown a gross revenue of \$121,461,871. and a remarkable net profit of \$42,599,717. Rochester to Batavia, a thirty-three mile railroad, was opened in 1837. Utica and Syracuse followed in 1839, adding 53 more miles with Auburn and Buffalo connected in 1842. By 1842, existing gaps between Albany and Buffalo had been plugged but all of these links were operated under independent ownership and not as a through

line. When the "fast express service" between Albany and Buffalo was instituted on July 10, 1843, the best time advertised for the distance was twenty-five hours at a one-way trip cost of \$11.50. By 1850 the rate was slashed to \$9.75 and the run took twenty-two hours, as compared to the Empire State Express's present-day five hour schedule.

When the Mohawk and Hudson was first opened, steamboats had been operating between New York and Albany for twenty-four years. It had originally been believed that physical difficulties in constructing a road along the Hudson would be insurmountable or so expensive as to make competition with the palatial steamers impossible.

By 1850 a direct through rail route from New York City to Buffalo had not yet been established but the Hudson River Railroad chartered in 1846 was opened for operation between New York and Poughkeepsie on December 31, 1849, and in less than a year the road was destined to push on as far as East Albany.

The various restrictions, however, on this network of New York lines presented interesting inconsistencies on the part of state legislature. For example, the Schenectady and Troy line was allowed to charge passengers 6 cents a mile. The Mohawk and Hudson was unrestricted, while the Auburn and Rochester began with a 3-cent ceiling, eventually raised to 4 cents.

Locomotives on the through trip from Buffalo to Albany were interchanged, for it was considered impractical to put more than one hundred miles of continuous service on an engine. And at 50-mile intervals, locomotives usually were stopped and permitted to cool off while engine men gave them at least a superficial inspection.

Schedules of the day reveal that passengers were carried directly from Albany to Buffalo without a night's stopover during the summer months. In winter the trip was broken at the halfway mark. Usually in winter it took more than one engine to pull the trains over snow-covered routes and not only couldn't the tandem engined trains operate as well at night but as the temperature dropped during the night axles and wheels were more subject to crystallization and breakage.

The Baltimore and Ohio, meanwhile, striking out toward its Wheeling (then Virginia) goal and the Ohio River, had advanced as far as a point opposite Harpers Ferry on the Potomac by December 1, 1834. There rapid progress bogged down. With a further aim of connecting the Chesapeake

1843. RAIL-ROAD ROUTE 1843.

Albany & Buffalo.

FAIR NOTICE—ARRIVAL TO CLEVELAND JULY 10 1843.

Those who pay through between Albany and Buffalo, - \$10. in the best cars, 25. in accommodation cars, which have been arranged, equipped and lighted.

Those who pay through between Albany & Rochester, \$8. in the best cars, 20. in accommodation cars.

THREE DAILY LINES.

Through in 25 hours.

| GOING WEST. | | | | GOING EAST. | | | |
|-------------|---------|-------------|---------|-------------|---------|-------------|---------|
| Leave | Arrive | Leave | Arrive | Leave | Arrive | Leave | Arrive |
| Albany | 8 A.M. | Albany | 8 A.M. | Albany | 8 A.M. | Albany | 8 A.M. |
| Schenectady | 10 A.M. | Schenectady | 10 A.M. | Schenectady | 10 A.M. | Schenectady | 10 A.M. |
| Utica | 12 P.M. | Utica | 12 P.M. | Utica | 12 P.M. | Utica | 12 P.M. |
| Syracuse | 2 P.M. | Syracuse | 2 P.M. | Syracuse | 2 P.M. | Syracuse | 2 P.M. |
| Albany | 4 P.M. | Albany | 4 P.M. | Albany | 4 P.M. | Albany | 4 P.M. |
| Albany | 6 P.M. | Albany | 6 P.M. | Albany | 6 P.M. | Albany | 6 P.M. |
| Albany | 8 P.M. | Albany | 8 P.M. | Albany | 8 P.M. | Albany | 8 P.M. |
| Albany | 10 P.M. | Albany | 10 P.M. | Albany | 10 P.M. | Albany | 10 P.M. |

EMIGRANTS WILL BE CARRIED ONLY BY SPECIAL CONTRACT.

Passengers will procure tickets at the offices at Albany, Buffalo or Rochester, directed to be entitled to seats at the reduced rates.

Fare will be received at each of the above places to any other place named on the route.

NY Central

An 1843 schedule boasted through trains from Albany to Buffalo. The schedules were rarely met.

Bay seaport with St. Louis, work had begun on the Marietta and Cincinnati Lines, the Ohio and Mississippi and the Central Ohio.

When Louis McLane took over as second president of the B. & O. in 1836, the road, which was showing a profit largely based on the five hundred barrels a day of flour moving into Baltimore from the western end of the line, was in poor physical condition. The roadbed between Baltimore and Ellicott's City, was completely rebuilt, and the steep inclined planes over Parr's Ridge near Mount Airy, where winches turned by horse power had been required to assist the locomotives and cars uphill, were eliminated and a gradual easy, sloping grade constructed. That same year the B. & O. was given its first contract from the government to carry mail on its regular trains (in 1838 President Martin Van Buren signed an act of Congress making every railroad a post route).

Pushing the line on west from Harpers Ferry was a project filled with plenty of trouble. Surveys showed that an additional \$9,000,000 capitalization would be needed to reach Wheeling. Virginia subscribed \$1,000,000 of this amount but stock sales bogged down due to the business panic.

HUDSON RIVER Railroad.

This Company is prepared to issue **Commutation Tickets** to residents on the line of the road, at reduced prices.

Persons, commuting for 6 months or for 1 year, from Feb. 1st, and requiring 120 tickets per quarter, will be supplied at the following rates:

| | |
|---|---|
| Between N. York & Manhattanville 10 cts. pr ticket. | |
| " " Yonkers.....14 " | " |
| " " Dobbs' Ferry...18 " | " |
| " " Tarrytown....22 " | " |
| " " Sing Sing.....26 " | " |
| " " Peckskill.....34 " | " |
| " " Cold Spring....43 " | " |
| " " Fishkill.....48 " | " |
| " " Po'keepsie....60 " | " |

Persons commuting for the next quarter only, (February, March and April) will be charged an advance of 20 per cent. on the above rates.

The tickets are not transferable, and are valid only during the quarter for which they are issued.

For further information, and for tickets apply at the office of the Company, 54 Wall Street.


New York, Jan. 23, 1850.

In 1850 cut price commutation tickets were introduced. They were good for four months of the year.

William Fargo, who later with Henry Wells formed Wells and Fargo, was Buffalo agent for this line.

NY Central

ALBANY AND BUFFALO RAILROAD.



FREIGHT TARIFF FOR THE WINTER OF 1844-5.

The rates hereon are for the Albany and Buffalo Railroad, and for the route west of Albany, the latter to be added to the rates hereon.

| By Freight Train | By Express Train |
|---------------------------|---------------------------|
| Albany to Buffalo 100 | Albany to Buffalo 120 |
| Albany to Schenectady 50 | Albany to Schenectady 60 |
| Schenectady to Buffalo 50 | Schenectady to Buffalo 60 |

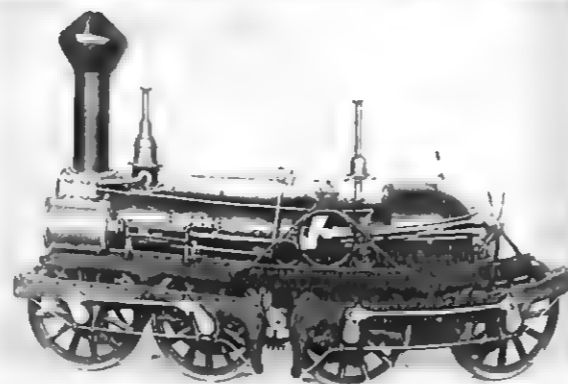
EXTRA TARIFFS.

For the Albany and Buffalo Railroad, the rates for freight and passengers are as follows:

For the Albany and Buffalo Railroad, the rates for freight and passengers are as follows:

Dated December 10th, 1844.

B&O



Eastwick and Harrison built B. & O. Mercury (top) in 1842. Asa Whitney (above) was completed in 1840.

Between Harpers Ferry and Cumberland, Maryland, the terrain became increasingly rugged with the Sleepy Creek Mountains, the Great Northern Mountains, Siding Hill, and the Patterson Creek Mountains as intervening obstacles. Three tunnels, one 90 feet long at Harpers Ferry, one 1208 feet at Doe Gully and another 250 feet at Paw Paw Ridge were driven through solid rock. In addition, 11 viaducts and 14 arched bridges were constructed including the first iron suspension railroad bridge, a 124-foot long affair built at Harpers Ferry.

By 1846 Cumberland was linked to Baltimore but McLane had been forced to visit Europe again to borrow more money since the 1837 and 1839 business flop had been more than a mild recession. It was in 1846 that McLane, studying the road's \$650,000 a year gross income decided to departmentalize the railroad to increase efficiency. He set up three distinct departments, then a novel idea, establishing a Master of the Road who was responsible for construction and maintenance of the right of way, a Master of Machinery vested with responsibility for all rolling stock and a Master of Transportation charged with supervision over traffic direction, rate establishment and promotion necessary to secure freight and passengers.



First B. & O. locomotive to reach Frederick, Md., in 1839 was the 4-4-0 horizontal boilered Atlas. Above painting showing its arrival was done by H. D. Still. Note similarity of passenger cab to stagecoach.

Despite McLane's dynamic direction and the persistency of his successor Thomas Swann, who took over when McLane's health failed in 1848, by 1850 the B. & O. was still less than twenty miles beyond Cumberland. Stockholders, who seemed impatient, failed to realize that during the first three more years required before the first train would reach Wheeling, Swann's Master of the Road would have to drill 11 more tunnels, build 113 more bridges and cut and fill countless thousands of yards of through way.

The fifth decade of the nineteenth century—1840 to 1850—hadn't been a sedentary one. Pioneers had pushed their way overland to the Pacific Coast or had shipped around Cape Horn to California. By mid-century, the western seaboard was relatively heavily populated and the vast area between it and the Mississippi was slowly being filled. Mormons, who had been persecuted in the Midwest, refused to give up their beliefs and pushed farther westward to Utah.

Texas had fought and won its freedom from Mexico and in 1845 became a part of the Union.

While New Englanders were pushing a railroad from Boston west to Albany, government troops were at war with Mexico

and in 1846 the area that was to become California, New Mexico, Arizona, Nevada and Utah had been ceded by the Mexican government to the United States.

On May 24, 1844, after more than a year of experimenting and several major failures, Sam Morse's telegraph line from Washington to Baltimore along the B. & O. railroad carried the famous message written by Anne Ellsworth, "What hath God wrought," and within two years telegraph lines were to follow rail routes to join Jersey City with the nation's capital. By 1850 telegraph wires stretched as far west as Cincinnati.

In 1841, a Britisher by the name of Bradshaw introduced the first railway timetable and in 1847 John Doggett, Jr., New York City, issued the first railroad guide, a 132-page pamphlet complete with maps, priced at a shilling and named, "Doggett's United States Railroad and Ocean Steam Navigation Guide." Joseph Perham of Boston had come up with a novel idea to promote rail passenger travel by initiating the first special rate, one-day excursion trip. Perham's excursion covered the panorama of the Saguenay, St. Lawrence and Niagara Falls.

Trains of the period were largely painted gay yellow, light blue or bright red with the preference running largely to yellow.



B. & O. John Hancock locomotive was an improved grass-hopper type with power transmitted to four wheels.

Canada's first steam engine was the Dorchester which began on the Champlain and St. Lawrence road in 1847.

CNRS

VERMONT CENTRAL RAILROAD. TIME CARD.

| | 1st Pas. Train. | | 2d Pas. Train. | | Miles. |
|-------------------|-----------------|------|----------------|-------|--------|
| | DOWN. | UP. | DOWN. | UP. | |
| Montpelier | 4:20 | 4:55 | 10:40 | 9:30 | 0.0 |
| Northfield | 5:00 | 5:45 | 11:10 | 10:20 | 7.1 |
| Roxbury | 6:00 | 6:30 | 11:30 | 10:40 | 8.5 |
| Brattleboro | 6:25 | 6:55 | 12:01 | 11:10 | 15.0 |
| Randolph | 6:50 | 7:20 | 12:15 | 11:25 | 21.1 |
| Bethel | 6:54 | 7:00 | 12:30 | 11:35 | 27.4 |
| North Royalton | 7:05 | 7:35 | 12:43 | 11:45 | 33.4 |
| Royalton | 7:12 | 7:42 | 12:47 | 11:50 | 34.4 |
| South Royalton | 7:18 | 7:48 | 12:53 | 11:55 | 35.4 |
| Sharon | 7:20 | 7:50 | 1:00 | 12:00 | 36.4 |
| West Hartford | 7:45 | 8:15 | 1:10 | 12:10 | 37.4 |
| White River Vt. | 7:55 | 8:25 | 1:20 | 12:20 | 38.4 |
| White River Junc. | 8:05 | 8:35 | 1:30 | 12:30 | 39.4 |
| North Hardland | 8:25 | 8:55 | 1:40 | 12:40 | 40.4 |
| Hardland | 8:35 | 9:05 | 1:50 | 12:50 | 41.4 |
| Windsor | 8:45 | 9:15 | 2:00 | 1:00 | 42.4 |

BETWEEN MONTPELIER AND MONTPELIER.
Leave Montpelier at 4:20 and 10:40 A. M. and 7:30 P. M.
Leave Northfield at 7:30 A. M. and 4:25 and 8:50 P. M.
The freight will be taken by the 4:20 A. M. train from Montpelier and by the 8:50 P. M. train from Northfield, and remain over night at Montpelier.

All freight, and irregular trains, will keep out of the way of the Passenger trains, according to the Book of Rules and Regulations.

The first Passenger train up from Boston, will pass the second passenger train down, at W. R. Junction at 1:55 P. M.

The Conductor of the first passenger train down, will leave his Passenger & Baggage Car at Windsor, and take the cars of the first up train to W. R. Junction, and then attach to his train, the cars from the Northern road.

The Conductor of the second Passenger train down, will switch off one Passenger and Baggage car at W. R. Junction, then proceed to Windsor, where he will deliver the rest of his train to the Ballen's Conductor, then attach his engine to the cars which were left by the conductor of the first train down.

To commence Monday, July 28, 1840.

JAMES MOORE, JR.

CNRS

Oldest Vermont Central timetable on record.
1849, linked Windsor with Montpelier.



The locomotives were gaudy, gleaming iron and wood monsters of bright red with brass trim and frequently sporting gold art work symbolic of their names, such as Reindeer, Bull Dog and Eagle.

ERIE R. R.—TRAINS AND TROUBLES

The bulk of the new lines had a struggling time but none found tougher going than the New York and Erie. Its charter had been issued in 1832 but the germ of the idea for the Erie dates back to 1829 when William G. Redfield, after making a trip from New York to the Mississippi, issued a pamphlet, "The Geographical Route of a Great Railway," which was almost exactly the line of survey the Erie was to follow.

Erie's first president, Eleazar Lord, was a leader of questionable judgment although his sincerity of purpose has never been doubted—something that cannot be said for several of his successors. It was Lord who came up with the idea to build the railroad on wooden piles in order to avoid problems presented by snow. One hundred miles of piling were driven at a cost of \$1,000,000 and then even before rails were laid on them, the piling rotted and was abandoned. This figure may seem fabu-

lously high but not when one realizes that in some sections such as the Chester Meadows, a marshy morass, 50-foot long pilings were used and so spongy was the ground into which they were driven, that in some instances it was found necessary to drive three pilings, one on top of the other, before solid foundation was reached. In some places, the wooden underpinning was 140 feet underground. In other locations on rocky terrain, holes for the pilings had to be hand sledged and blasted with black powder.

When the first fifty-four miles of the railroad had been completed to Middletown in 1843, the line's construction engineers recommended that the 6-ft. gauge be changed to 4-ft., 8½-in. Had Lord approved the idea then, the alteration would have cost the New York and Erie \$250,000 but Lord was stubborn and about forty years later when the shift was finally made, as already stated, \$25,000,000 was involved.

In 1841 another Erie error in judgment changed the whole complexion of New York railroading. The New York and Harlem railroad was suffering financial trouble and proposed that the Erie continue its line from Piermont 26 miles north of New York City Hall on the west bank of the Hudson

At right is an example of rail track construction, a section of U-rail built for B. & O. in 1841.



NOTICE TO IMMIGRANTS!!

By 1855 the notice at left was published by the Sacramento Settlers Association warning immigrants against crooks selling public free land.

AT&SF

NY Central

River down the east bank to connect with the New York and Hudson, the crossing itself to be made by ferry. It's quite possible that had this \$90,000 connection been made, the present day metropolitan rail-road alignment of the east might well have been changed.

Grand Central Terminal today would have been the Erie's eastern terminus and what happened to Poughkeepsie, Albany, Schenectady and Buffalo might well have happened to Corning, Cornell, Jamestown, Port Jervis and other towns dotting the present Erie.

Although for a time it almost seemed that way, all decisions concerning the Erie weren't gross blunders. The request made, for example, to the New York legislature to permit the Erie to build on the south bank of the Delaware in order to avoid formidable rock formations on the east bank was granted by New York in 1846 and permission was given by Pennsylvania in 1848.

The Erie needed rail. Rail from England was costly and slow to arrive from abroad. Despite financial difficulties, directors of the Erie gambled on the ability of the Scranton brothers of Slocum Hollow, Pennsylvania. The line put up the money

needed by the Scranton boys to start one of America's first iron rail factories, a start that incidentally led to the vast Scranton empire and changing of the name of Slocum Hollow to Scranton. More important to the Erie, it got its rails at cost, far cheaper than it could from England (\$46 rather than \$86 a ton and delivery was speedy. The Erie also had a paying investment in the Scranton brothers' business which supplied rail at a good profit to other railroads.

Although some of the road was tracked with the Scranton brothers' 50-pounds-to-the-yard iron, much of it unfortunately was capped by thin iron plate. Snakeheads on the Erie, when it finally began to operate, were notorious and on occasions lethal.

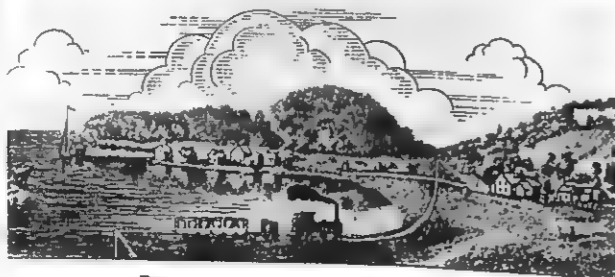
Like all railroads, the Erie had many enemies. One of its most bitter foes was the owner of a large property on the east bank of the Hudson directly opposite the company's pier at Piermont. This individual contended that the long jutting pier would divert the Hudson's current and wash away his property. The man's name—Washington Irving.

On June 17, 1841, the first locomotive to run on the New York and Erie Railroad traveled from Piermont to Ramapo and





Erie
William Morris, grandson of Revolutionary War financier Robert Morris, invented baggage check.



Erie
Ground was broken for Erie Railroad at Piermont, N. Y., sometimes called Tappan Landing, in 1838.

return. The locomotive, in keeping with the president of the line's egocentric nature, was named the *Eleazar Lord*. But the company's president was not to have his first trip until June 30, when the locomotive *Rockland* pulled the line's first passenger train.

While much of the Erie's line was flimsily built at best, it also boasted one of the most masterful engineering structures of its period. Near Deposit, New York, at the western end of the line, the valley of the Starrucca Creek seemed impassable. Three separate contractors tried and failed to construct a passage over the valley for the railroad. The hope of reaching Binghamton by 1848 seemed doomed, at least until the line hired James P. Kirkwood, a Scottish engineer who had handled many of the tricky construction problems on the Long Island and the Boston and Albany railroads. Kirkwood claimed that he could build it but would not even hazard an estimate on the amount of money required for the bridge. The railroad's directors had no alternative but to take a chance on Kirkwood to overcome their stymied right of way.

Kirkwood first built a three-mile short-line railroad to a quarry he established up the Starrucca from the projected bridge site. With 800 laborers working day and night, Kirkwood planned and directed a 1200-ft. long, 110-ft. high, 18-arched structure at the cost of \$320,000, the world's most expensive railroad bridge of the day. The bridge still stands and is in use today, a testimonial to the indomitable spirit of its designer.

FISTS MAKE THE CONDUCTOR CAPTAIN

Railroad decisions and the future course to be taken by railroads in all matters was not always settled over a desk in the main office. Occasionally a pair of strong fists somewhere along the main line set the pattern. If engineer Abe Hammil of the Erie had had a bit more courage, a little more brawn or faster footwork, engineers might be the masters of trains today and conductors relegated to mere fare collectors. Before 1842 there had been no direct means of communication between the conductor and the engineer other than makeshift systems of signalling with arms and hands. The practice was for the conductor to climb to the roof of the car and to shout at the engineer or to throw something at him to attract his attention. If the engineer's attention was caught, and his curiosity overcame his stubbornness, he might stop the train to find out what the trouble was—usually the ejection of a ticketless passenger or an obstreperous drunk. But since no definite authority was given either to the conductor or to the engineer, many engineers considered their judgment superior in running the train and acted accordingly.

Erie engineer Hammil was of that school. He refused to adhere to any signals by conductors riding on his trains—in fact he treated his fellow trainmen with the same disdain that he displayed to his passengers. In 1842 a new conductor, Ebenezer Ayres, was assigned to his train. Ayres rigged a rope over the tops of the cars to the engine, at the end of which he tied a chunk of wood. This was done without Hammil's knowledge.

When Hammil swung up into the cab of his train at Piermont one day, Ayres explained his new system, "When I want you to stop the train, I'll pull on the rope and when you see the wood toggle bob, you stop."

Hammil figured differently. It was he who would determine when the train was to stop and as soon as he got under way he cut off the stick. All Ayres pulled was a slack cord. At the end of the route, Ayres

rigged his line again and tied on another stick. On the run back, Hammil again cut away the signalling device. When the train came to a stop at Piermont, Conductor Ayres removed his coat and walked forward to the cab. When Hammil refused to come down, Ayres went up after him. The fight that followed was apparently a bloody one. Ayres knocked Hammil out of the cab, then jumped to the ground and continued to pummel the engineer until the engineer agreed that from that time on Ayres was boss and the train would stop whenever Hammil saw the wood bobbing.

From that day, Ayres and generations of conductors after him have been in charge of running trains. A gong later replaced the stick, and still later compressed air signals were used, but conductors never again lost their authority to engineers. The tradition of who was captain was established.

TRESTLES AND WATER TANKS

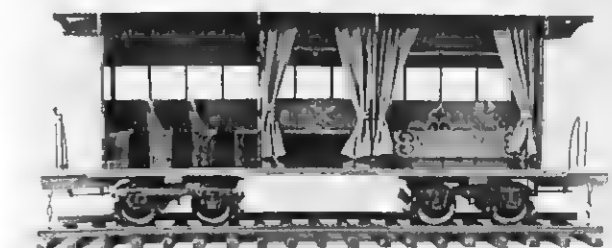
The Erie, at first, was a hard luck road. During its first two months of operations, it had 16 serious accidents. At Portage on the Genesee River, it took two years, \$175,000 and a 300-acre forest to provide the 16,000,000 board feet of timber to build the 250-foot high, 900-foot wide wooden trestle. Some of the lines' officials claimed that despite added cost, iron should be used in bridge building. To keep peace among the directors a switch was made from wood and the first iron bridge constructed on the Erie was completed near Mast Hope in 1849. Rust hadn't even had an opportunity to form on the new structure when on July 31 of that year, the engineer of a train detected a loud cracking sound as he moved onto the Mast Hope structure. The engineer was neither hero nor fool. He leaped from the cab and suffered minor scrapes and bruises. But a brakeman and two trainmen assigned to attend to livestock in an open bed freight car immediately aft of the engine plunged to their deaths when the bridge toppled like a deck of cards.

The tall rickety Genesee River wooden structure, although it swayed, creaked and sounded as though it, too, might fall, supported the weight of the trains, but the jinx on the Erie continued and a fire in 1852 totally destroyed the towering mass of criss-crossed timber to create a blaze that could be seen for forty miles.

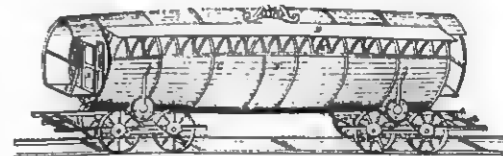
It was in the mid-Forties that the Erie made its bid to get out of the jerkwater railroad class. Near the right of way near Middletown, New York, was a spring on top of a hill forming a gushing stream that cut down under the rail bed. Workman



These ten ton, iron pot hopper cars were used on B. & O., 1850—now at B. & O.'s Baltimore Museum.



Cutaway model of an original sleeping car used on the Cumberland Valley Railroad is pictured above.



Southern

The Jasper or "barrel car" operated on the South Carolina Canal and Railroad Co. line during 1841.

passed water up from the stream to the engines used in constructing the line to the tune of 600 pails a day which added up to a lot of water jerking. The owner of the spring laid a pipeline down the side of the hill and extended it slightly above locomotive height out over the railroad right of way. The railroad company paid him \$2,500 for his novel arrangement and the perpetual water rights to initiate what is thought to be the first water tanking stop on any road in the country.

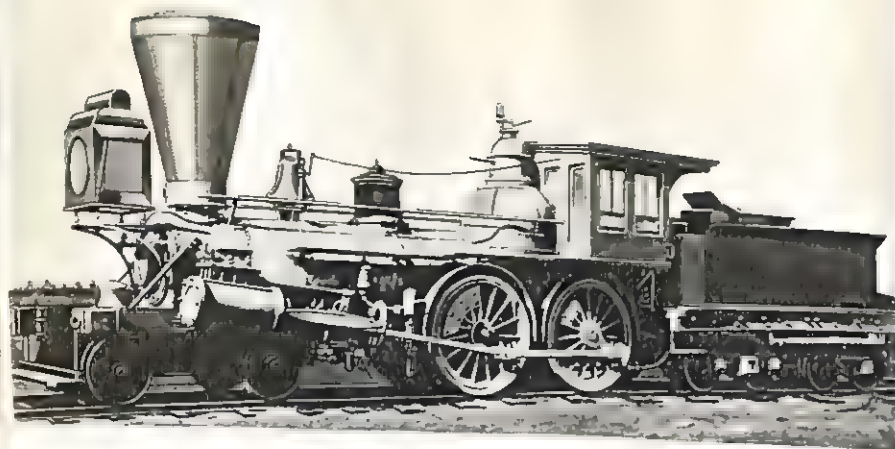
Shortly after this incident, an even more enterprising gentleman some fifty miles to the south, dug a huge hole in the ground of a small hill fifty feet or so beyond the railroad track. He, too, extended pipe down to the rails and installed a cut-off valve at the top. Records indicate that he had heard the price paid for the other location and held out for \$500 more before he would agree to let the valve be touched. With cash in hand the gentleman turned over his project to the Erie officials and disappeared, not even waiting for the valve to be opened. One train was restocked with water, then the flow ceased. Other local farmers could have told the Erie officials.



NY Central

A reply is respectfully requested.

73

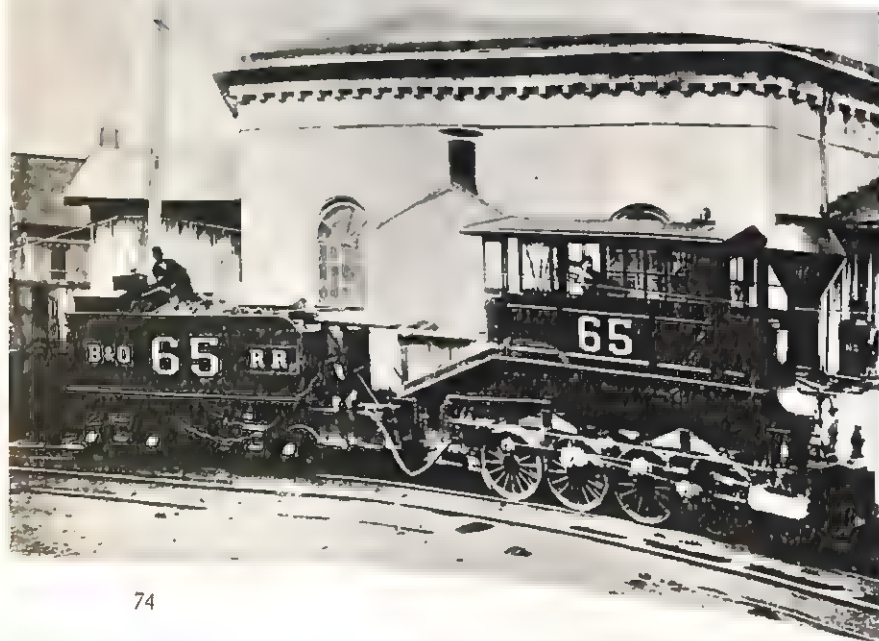


Old No. 1, known also as Bob Ellis and Iowa was the first locomotive to run in Wisconsin.

C.M.SP&P



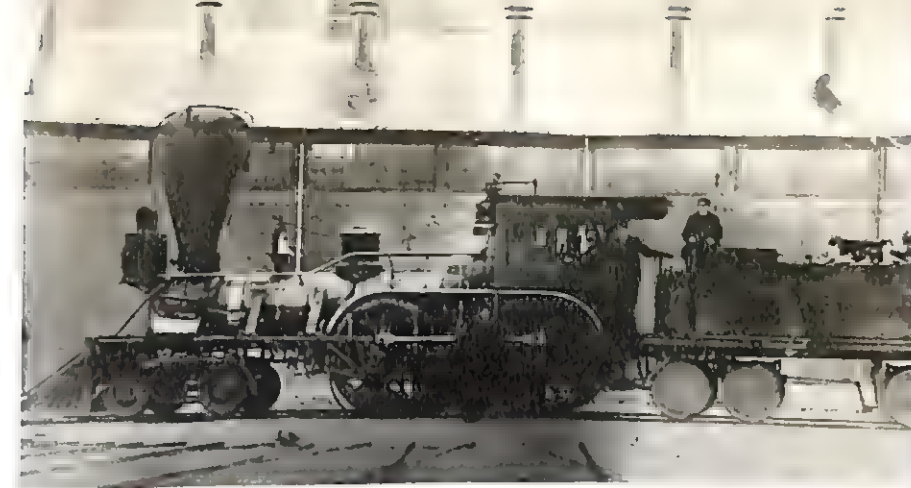
Principal freight locomotives used on the B. & O. and other roads were these Camelbacks.



First Winans' Camel was put into service on the B. & O. in June of 1848 the last in 1863.

New York and Erie wood burning engine No. 13 was built in 1848. Swinburne, Smith & Co.

Eric



NY Central

Diamond shaped stack featured on both wood and coal burners was popular style around 1850.



No. 61, a 4-4-0 of the New York Central and Harlem Railroad, was distinguished by a neat cap stack.

attempts since a charter was issued for the Detroit and Pontiac in 1830, even though Detroit was a muddy little backwoods town and five-sixths of the entire state had no population at all. A railroad across Michigan would eliminate a 700-mile detour by the way of Mackinaw and more important it would bring much needed business to Detroit by cutting the lake route journey to one-third. Such thinking brought into being the Michigan Central, later to become a part of the New York Central System.

The Michigan Central by April of 1849 had extended a road 218 miles from Detroit across Michigan to New Buffalo. Lake steamers at the time charged \$6.00 cabin class for the trip from Buffalo to Detroit. The Michigan Central in order to get business for its new railroad was also forced into the boat business, to pick up freight and passengers at the end of the New York and Buffalo route. So the M.C. ran steamers from Buffalo 270 miles to Detroit, then over

its new railroad line to New Buffalo where a change was made to another Michigan Central boat for the final 45 miles into Chicago—533 miles for \$5.00. Their competitors were forced to cut their prices on their all-water 975-mile route in order to meet competition. By Michigan Central, it took only a day and half from Detroit to Chicago while by water it took four to six days, but after a try at the rails, most travelers shifted back to the longer water route. Although the railroad's directors seemed to wonder why, occurrences such as the following may explain.

One passenger train, making a winter crossing, ran out of water and wood. Firemen and passengers had to shovel snow into the water tank and gather fallen limbs along the right of way. And then after a night stalled in the wilderness, horses finally towed the bogged down locomotive into New Buffalo. With heatless cars, no water or toilets, such occurrences were not jokes.

RAILS BRIDGE THE MISSISSIPPI



ABRAHAM LINCOLN, LAWYER, HELPS FIGHT STEAMBOATS
SO THAT STEAM ENGINES CAN CROSS TO THE WEST

The Iron City, built in 1856, was an eight coupled locomotive for heavy freight and pushing service. The engine weighed 66,000 pounds, and was equipped with flexible beam truck and variable cut-off.



B&O

In 1852 Albert Fink developed the Fink Truss Bridge design, widely used for 30 years. Inverted A-frames transferred the loads gradually out to the larger end supports.

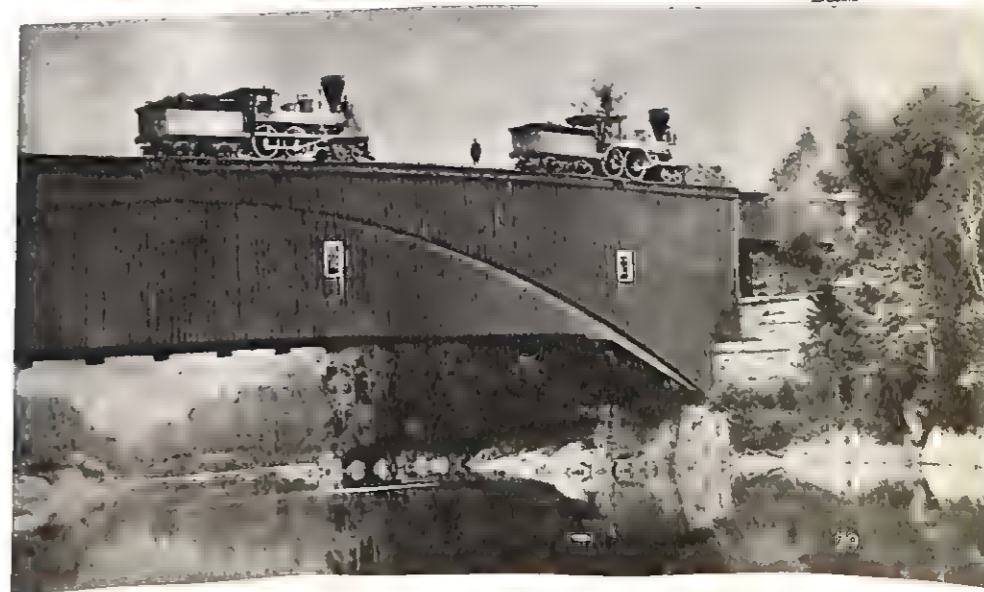
THE ten years from 1850 to 1860 showed an expansion in railway mileage from 9,021 to 30,626 miles. Through the influence of railways and their handling of mail, postal costs had been drastically reduced from 5 cents for distances up to three hundred miles and 10 cents for greater distances to 3 cents after 1851 for half ounce letters carried up to 3,000 miles.

The period when states attempted to build and operate their own railroads was drawing rapidly to a close, with financial failure the keynote of state monopolies in Georgia, Indiana, Illinois, Massachusetts, Michigan, North Carolina, and Pennsylvania.

The second half century dawned with the bulk of the experimental work of railroading largely accomplished. Cross ties and T-rails had become nearly standard roadbed and rail design characteristics. While the bulk of iron rails was still being imported from England, one piece U-iron rail had been rolled by Mount Savage Iron Works near Cumberland, Maryland, as early as 1841, and in 1844 the Mount Savage Works rolled the first T-rails. The Montour Rolling Mills shortly thereafter began turning out T-rails at Danville, Pennsylvania.

Two 4-4-0 wood burners, the Pehaugun and Winnepesaukee of the Boston, Concord, and Montreal RR, are shown crossing a wooden bridge at Wells River, Vermont, 1853.

B&M



Make Your Reservations Now

H. FINCH'S
Daily Line of Stages
KENSICO
MILE SQUARE, NORTH CASTLE,
 And A. DOWNES' STORE.



IN CONNECTION WITH THE
NEW YORK AND HARLEM RAILROAD.
 On and after MONDAY, MAY 24, 1853, a Stage
WILL LEAVE KENSICO,
 On the arrival of the 3:35 A.M. Train from New York, passing by the way of Robbin's
 Mile, Mile Square, South Castle, to A. Downes' Store, North Castle.
LEAVE NORTH CASTLE
 At 6:15 o'clock in the Morning, passing by the way of South Castle, Mile Square, and Robbin's
 Mile, arriving at Kensico Station in time to take the 8:25 Train to New York.
 Passengers to the above places will find it to their advantage to secure Through Tickets at the Broome Street Office, New York, where they can be obtained at reduced rates.
HERMAN FINCH, Proprietor.

Stage coaches were still in general use in the East after 1850; this line made train connections.

MID-CENTURY HAZARDS

The locomotives through the 1860's continued to improve but still were simple to operate, having only a throttle, an injector lever or valve, and a Johnson bar (reverse lever). Safety now became a matter for concern. In 1848 in Massachusetts a statewide recapitulation of all rail accidents up to that time showed that only 22 passengers had been killed and 69 injured. By 1852 the nation's picture was beginning to change, but not too drastically. Of 55,350,000 passengers carried that year, only 42 were killed in accidents, but with bridges and tunnels, the casualty rate of freight brakemen was considerable for in twelve months 120 employees were killed, 32 of them having been struck by bridges. By 1853 a continuing upswing in casualties made it appear that the pioneering railroads' beds, bridges and tracks had more need for repair to their present lines than for further expansion. But to most railway directors, safety was of minor concern and the motto seemed to be "Let's lay more track and to hell with maintenance."

That year there were 138 major railroad accidents with 234 passengers killed and 496 passengers seriously injured. This rapid deterioration of rolling stock, railroad beds, and rails was brought to public prominence that year when railroading's most shocking concussion to that date took place on the Boston and Maine Railroad near Andover, Massachusetts. The accident occurred on the Norwalk Bridge with a loss of fifty-two lives including that of President-elect Franklin Pierce's son.

Aside from the gradual deterioration of equipment, the lack of any really efficient block system signals combined with human frailty to cause many accidents. Pure amateurishness accounted for other collisions. An example of this occurred on the Hudson River Railroad on December 14, 1851 near Croton, New York. A 4:00 train out of Manhattan had been stopped just beyond the Croton station when the conductor had come upon two irascible passengers who refused to pay fares. During the scuffle as the conductor tried to bounce the two deadheads, an unscheduled engine without cars in tow puffed around a curve in the track. Its primitive braking equipment failed to stop it in time. Crunchingly it bashed into the end of the rear coach, injuring several paying customers and shaking the wood soot off a score of others.

The crews of the two locomotives fumbled around in a try to disentangle the mess, treat injured passengers, console badly frightened ones and remove debris from the track when the 5:00 train from New York arrived. Fortunately several passengers had been sent back to the tracks to warn the 5:00 local that the road was blocked. Learning of the disaster, its conductor ordered his engineer to proceed back to a switch, then the locomotive and its passenger cars pulled forward on the west track of the double track line and chugged up to the scene of the accident. Apparently the conductor planned to offer assistance. But he neglected to send any flagmen ahead or to the rear.

Meanwhile the 5:30 Peekskill train came barreling down toward Croton on the west track to which the 5:00 local had been shunted and rammed full speed into the 5:00 local. It was a mess designed to put a scare into the most unconcerned director as four locomotives and three sets of passenger cars played a crunching game of leap frog over the right of way. That there were no fatalities was pure luck. The directors of the line immediately took steps toward better "safety precautions" by firing the three conductors and then promptly dismissed the accident.

GRAND CROSSING

Of course, certain rail concussions could be termed Acts of God, such as the rail washout on the Michigan Southern and Northern Indiana in June of 1859 with a toll of forty-three lives. But more of the accidents were based on sheer stupidity. In 1852 a fourteen-mile stretch from Calumet to Chicago was being built to bring trains of the Michigan Central Railroad into the city. A short distance outside of Chicago, the Northern Indiana Railroad, now a part of the New York Central, was also extending its tracks into Chicago. Surveys indicated that the rails would cross. The Northern Indiana reached the point of intersection first and refused the construction crew of the Illinois Central (building the Michigan Central tracks) the right to cross its line.

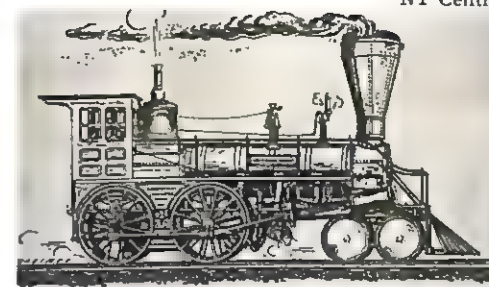
Under cover of darkness the Illinois Central's chief engineer, Colonel R. B. Mason, established guards and with a large crew of husky laborers put the line through before daylight. The Northern Indiana set up a protest but the crossing was in and stayed in to become known as the Grand Crossing.

Later, a heated contest developed between engineers of locomotives on the two tracks to attempt to beat one another to the intersection, the loser, of course, having to brake to a stop to permit the speedier locomotive and its passenger cars to pass through. The game naturally was played without the knowledge of the passengers in either train. It was as senseless as present day hot-rodgers head-on contests on public highways, only with more personnel involved.

To the competing highballers, it was good clean sport until one April night in 1853 when a fast passenger train broadsided a mixed freight and immigrant train with eighteen deaths and nearly sixty injuries resulting. Fortunately for the railroads involved, claims for death and accidents on railroads were quite modest.

The accident and its tragic aftermath fortunately brought about a state law passed first in Massachusetts in 1854 and then rapidly adopted by other states. This railroad legislation prohibited any train from crossing tracks of another railroad until the locomotive had been brought to a complete standstill and the tracks of the bisecting railroad inspected to be sure no train was approaching.

In 1850 although rail wrecks whittled modestly at the country's over-all personnel, the major cities' count lined up in this fashion population-wise: New York lead with 515,500, Baltimore second with



Governor Marcy was a wood burner on the Michigan Southern & Northern Indian Railroad. This later became a part of the Lake Shore & Michigan Southern in 1869 to form the route on which the trains of the New York Central now reach Chicago.



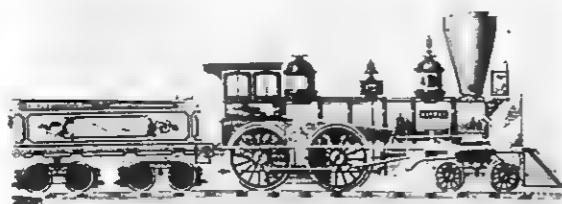
No. 75, a Class H built by the Schenectady Locomotive Works for the Chicago, Milwaukee, St. Paul and Pacific, was a 4-4-0 with 57-inch driving wheels. It was a wood burner and had a total weight of 47,750 pounds with a 1475 gallon tank.

C.M.SP&P

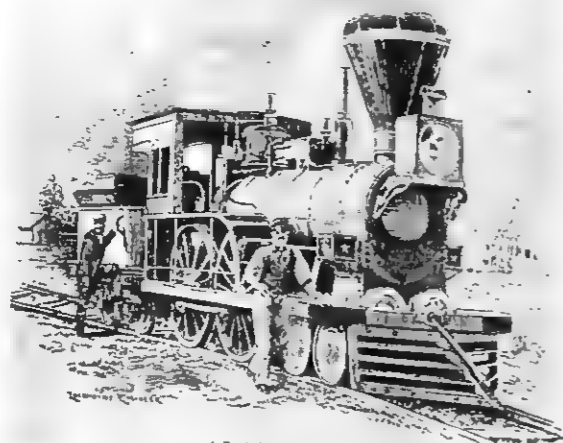
169,000. Brooklyn third with 138,000, Boston next with 136,000 followed by Philadelphia with 121,000 and Cincinnati with 115,000. From that point on the population of the major cities dropped off rapidly with St. Louis next in line with 77,000; Pittsburgh, 67,000; Louisville, 43,000; Buffalo, 42,000; Newark, 38,000 and Chicago, 28,500. Chicago, twelfth ranking in 1850, had made tremendous strides considering her puny and late start in the early 1830's.

FREIGHT SHIPPING—CANAL vs. RAIL

Despite the tremendous increase in railroad mileage by 1850, freight transport by inland waterway was by no means a thing of the past. The Illinois and Michigan Canal connecting Chicago with LaSalle and the Illinois River went into operation in 1852. Wisconsin linked Green Bay, a finger of Lake Michigan, with the Mississippi by building a canal between the Wisconsin and Fox Rivers. Indiana connected Cambridge on the National Turnpike with Lawrenceburg, 75 miles away on the Ohio River. Michigan was at work on a chain of



The Tiger was a beautiful 1856 Baldwin locomotive with silver boiler, green and gold cab, and red wheels. Tender was pink with green, red, and blue.



A Seth Wilmarth Shanghai

NY Central

Shown in the old print above is the Fury. This was a 4-4-0 locomotive of the American wood-burner type of 1855 by Boston designer Seth Wilmarth.



C.M.S.P.&P

The T. S. Davis, built in 1854, had clean lines of the H3 class. Photo was made after 1863 when locomotive was operated by Milwaukee & St. Paul RR.

canals to join Lakes Superior and Huron. and both tonnage and dollar-wise the canals still were far ahead of railroads. In 1852, for example, canals carried 9,000,000 tons of a gross value of \$1,188,000,000. Railroads during that same period handled 5,408,000 tons with an estimated gross worth \$1,081,500,000. Proportionately it would appear that the faster rail shipment media was selected for more valuable merchandise. Actually, however, the real bulk of American commerce was still being transacted by coastal vessels, which that same year carried nearly 20,500,000 tons with a gross dollar value of \$3,320,000,000.

In addition to canals and railroads, six large express companies were handling a huge business. However, since much of this went to both canals and railroads for at least part of the journeys, figures on express shipments aren't suitable for contrast. These express concerns were the Harnden Express Company (the first in the business), the Adams Express Company, American, National, United States and Wells, Fargo and Company. Wells, Fargo held a virtual monopoly on freight, valuables and passenger service west of the Mississippi where stage, prairie freighter, and pony express still predominated. In 1857 Wells, Fargo alone handled shipments of \$56,000,000 in gold.

LOCOMOTIVE IMPROVEMENTS

The two decades preceding the mid-century had paved the way for railroading to move ahead with a tremendous impetus. Tracks had been improved, construction lessons had been learned the hard way and new and better locomotives were being built. Before 1850 designers used full play of their imagination but certain standards were gradually evolved.

In 1845 Baldwin Locomotive Works had built a six-coupled locomotive of approximately 15 tons for the Philadelphia and Columbia. It was equipped with a flexible beam truck in which the first and second axles were permitted a degree of lateral motion, one to the right and the other to the left or vice versa. The coupling rods had spherical brasses and the driving boxes were fitted in cylindrically bored pedestals which were held in vibrating beams. The construction offered needed flexibility for locomotives to maneuver around sharp curves and work on uneven tracks which were characteristic of that period. On certain roads which because of difficult terrain, such as that encountered on the Philadelphia to Pittsburgh route, combined rails with canal and inclined planes, some canal boats were built in sections so they

could be coupled together when afloat. For transport over the rails they were unlinked and four-wheeled trucks would be rapidly hooked into place under either end of the disconnected sections. Actually these were amphibious passenger coaches.

The unique and usually one-of-a-kind monster locomotives of the pre-1850 era had largely fallen into disuse. One engine typifying this class was the 6-2-0 Stevens built by Norris Brothers of Philadelphia for the Camden and Amboy. The two drivers on this weird one were 96 inches in diameter and although it was strictly a yard dog, seven similar locomotives were turned out by Norris before the Philadelphia builder admitted the design was no good.

During the first half century the most notable of the locomotive manufacturers were M. W. Baldwin; the Norris Brothers (Long and Norris at one time) of Philadelphia; Ross Winans, Baltimore, Maryland; Smith and Perkins, Alexandria, Virginia; Joseph Harrison of Garrett and Eastwick (later Eastwick and Harrison), Philadelphia and Thomas Rogers of Rogers, Ketchum and Grosvenor of Paterson, New Jersey.

Railroaders began to realize that the locomotive had to be of a type designed to meet traffic conditions it would encounter. And since these conditions varied, two general classes of locomotives were required: those suitable for hauling freight requiring a high tractive force and comparatively slow speed, and those for fast passenger work where tractive force when running could be comparatively low while the speed must be high. Horsepower in locomotives is a product of tractive force and speed combined so that frequently it

was found necessary for passenger locomotives to develop more horsepower than the freight locomotives even though the two exerted widely different tractive forces. Since boiler capacity limits horsepower, it quickly followed that in proportion to the tractive force exerted, the passenger locomotives needed larger boilers than those intended for freight trains. The main features required for sufficient boiler capacity were large fire boxes with ample grate areas and a large amount of heating surface with a proper provision for circulation.

The 4-4-0 American type, which has a four-wheeled truck or bogie forward and four driving wheels in the rear, was the most popular of the passenger engines. Aside from Ross Winans' camel-type mountain use and freight locomotive of the more common 0-6-0 or 0-8-0 design, the first of the freight Moguls—the 2-6-0 type locomotives—were built by James Millholland of the Philadelphia and Reading Railroad and credit for their origin goes to him. These six-coupled jobs with the two leading wheels either directly below or just behind the cylinders placed about eighty per cent of their over-all weight, ranging from 54,000 to 59,000 pounds on the driving wheels. The true Mogul type was not to be introduced until 1863 when Rogers Locomotive Works turned out No. 36 for the New Jersey Railroad and Transportation Company, but the rigid framed, leading wheel Millholland-conceived 2-6-0s have been considered the true forerunner of that popular freight design.

Wilson Eddy of the Western Railroad was one of the first locomotive designers to lower the pistons so that they operated in

The first train to carry passengers from Baltimore to Wheeling is shown in this old photo of 1852. The Baltimore and Ohio Railroad locomotive, a 4-4-0 model, moving west from Cumberland, pulled six cars.

B&O



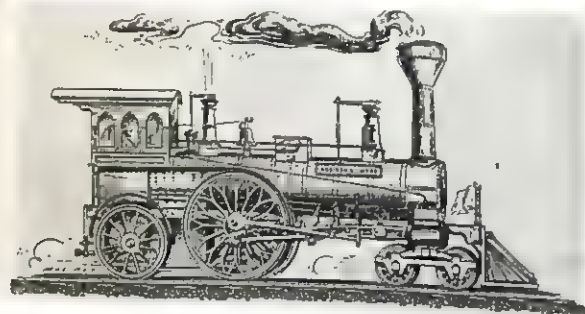


B&O

Cab built on top of the horizontal boiler and the 43-inch driving wheels were characteristics of Ross Winans' camel locomotives, first built in 1848.

Most camels were of 0-6-0 or 0-8-0 design, but this rare model, No. 139 of the B. & O. RR had a four-wheel leading truck. Few of these were made.

B&O



NY Central

The early speed demon Addison Gilmore, a 4-2-2 design, took first prize in the locomotive race from Wilmington to Lowell, Mass., in 1851.

a horizontal line with the wheels instead of on a diagonal as they were designed on earlier engines. William Mason saw Eddy's result on the locomotive Addison Gilmore which in October 1851, outperformed all other locomotives in a speed and pulling contest between Wilmington and Lowell, Massachusetts. Mason, a textile manufacturer, decided to enter the locomotive business. His first design was the James Guthrie, built at Taunton, Massachusetts, in 1852. This locomotive with horizontal cylinders was widely copied both for performance characteristics and inherent beauty of its styling.

By this time locomotives were beginning to be fairly efficient and complete in their essential means of operation other than brakes. A definite need existed for some form of more effective stopping than offered by the ordinary hand friction brakes. The Loughridge Chain Brake, although primitive, was an improvement. This functioned by means of a friction wheel located behind the right hand rear driving wheel. When a simple lever operation thrust it against the rear driving wheel, the friction wheel rotated and it in turn wrapped a chain around a shaft. The chain in turn



was connected by other chains or cables to the brake shoes throughout the train. Technically the Loughridge caused the locomotive to pull itself to a halt.

Railroad designers also began to experiment with hard coal, soft coal and coke as substitutes for wood. These experiments showed results generally favoring the use of coal or coal mixed with wood. It was soon discovered that bituminous coal could be used in passenger service provided locomotive boilers had large enough combustion spaces and were provided with a means to baffle and properly mix the gases. Naturally this involved a breakdown in the relative heating value of a ton of coal and a cord of wood and the relative cost of either delivered to the tender. Early test results indicated that a pound of Pittsburgh type coal was equivalent in heat value to 2.31 pounds of hard wood, and that a ton of coal was equal in heat output to 1 1/3-cords of hard wood. Following these surveys, it was simple enough for railroad engineers by plain mathematics, assuming all other factors were the same, to make their decision between coal and wood on a basis of relative cost. However, coal with its greater heat also necessitated added



B&M

The Chocorua ran from Woodsville to Littleton on the White Mountains Railroad under lease to the Boston, Concord and Montreal RR connecting Concord, N. H., to Wells River.



CNRS

Farmers and others who hauled cord wood to fueling spots were given metal coins like one above. These were redeemable at the company's office.

CNRS

Shown at left are examples of the currency which railroads of the time issued. Paper money here was printed in French and English by Canadian RR.



skill and refined judgment on the part of firemen. It also called for a more expensive to maintain and more intricate boiler design. These two complications caused wood burners largely to continue to get the nod of approval.

LAND-GRANT RAILROADS

In eighteen-fifty began a spectacular period of economic development in the middle west. Oregon had been acquired in 1846. This, coupled with the ceding of territory from Mexico and the discovery of gold in California, brought about an inevitable westward expansion. The Michigan Central and the Michigan Southern Railroads, both once state owned but now be-controlled by eastern capitalists, were beginning their dramatic race westward to link Chicago with the East.

Thirty-eight miles southwest of Chicago on the main stagecoach route was Aurora, a milling center, where the Aurora Branch Railroad was chartered in 1849 to build twelve miles to the north at a junction with the Galena and Chicago Union Railroad. On August 27, 1850, six miles of wooden rails had extended southwest from Turner Junction of the Galena line and through trains to Chicago via the Galena road east of the junction point began operation early in September.

With six miles of its own road, the leased Pioneer, and a single passenger coach, the Aurora Branch (first link of the Chicago, Burlington and Quincy Railroad which today operates 11,000 miles in fourteen states) became the second railroad to serve Chicago. By mid-October the rails had been extended to Aurora itself and about



the same time its two first locomotives arrived. The *Whittlesey*, a 24,000-pound locomotive with four driving wheels built by Norris of Philadelphia in 1849 and bought secondhand from the Buffalo and Niagara Falls Railroad, came by water on the brig, *Patrick Henry*. Within another month, the 28,000-pound *Pigeon* arrived. This was a Baldwin built 4-2-0 of 1837, of the *Black Hawk* type, which first made use of a device patented by E. L. Miller for transferring part of the weight of the tender to the locomotive in order to increase adhesion when starting. This had been purchased from the Michigan Southern and Northern Indiana.

By the end of 1850 the Aurora Branch was operating two trains daily between Aurora and Chicago. At that time Stephen A. Douglas of Chicago was serving in the United States Senate. He was very distressed, when he had been elected to the Senate in 1847, to note that the only result of Illinois' vast million dollar railroad promotion had culminated in the sale at auction of the ill-fated Northern Cross Railroad. Yet Douglas' enthusiasm for railroads was as strong as ever. With his own state in a shaky financial condition at best, Douglas conceived an idea which he thought would tempt private capital into Illinois railroad building, enhance the economic value of the state, and at the same time help the Federal coffers. West of Ohio the bulk of the land it had acquired after the nation was formed. For years it had



PRR
Pioneer was a popular name for locomotives. Model above was built by Seth Wilmarth of Boston for \$6,200 in gold. The 2-2-2s were a unique design.

Freight and fare rate-fixing came into being with the formation of the Great American Lake Shore RR. This 1855 poster advertises through-train service. NY Central

tried to sell its vast holdings at \$1.25 an acre with relatively few takers before the financial panic and practically none thereafter.

What better way to tempt capital into railroad building, Douglas figured, than to give land to the railroad promoters and let them build up the value of their land and the government land at the same time. Through his constant championing, Congress finally granted to Illinois 2,595,000 acres of public land for the Douglas program in early 1850.

One disappointment was in store for Douglas. Without his approval the whole land grant was turned over by the state, which had been given permission to handle its disposition, to the Illinois Central, to locate a north-south railroad with a branch from Centralia to Chicago. Some historians have referred to this grant as "the great land grab." Actually Illinois, when it turned over the property, incorporated some fairly astute conditions. Although the railway was to be exempt from paying taxes, it was to pay seven per cent of its gross earnings from charter lines, which over a period of years has amounted to more than double what the normal tax rate would have been.

The United States Government retained the right to transport troops, munitions and military supplies at half rates.

In later years, the United States was to grant railroads approximately 155,000,000 acres or an area larger than either Germany or France. By retaining alternate



C&NW

Shown at left is a typical view of a mid-century rail station. Horse carriages and stage coaches pulled up on Chicago's Kenzie Street to unload baggage and passengers for Chicago and Northwestern RR.

PRR

The Philadelphia, Wilmington and Baltimore RR was in operation by 1838 but it did not bridge the Susquehanna until 1866. The 1852 scene at right shows tracks laid across the ice over which 1378 cars of passengers and mail were carried during winter.



sections along the right of way, which owed tremendous increased property values to the railroads' existence, land grabs haven't been gifts but have turned out to be pretty smart prospecting.

Within a week after the land grant, relatively railroad-dormant Illinois sprang into action. The LaSalle and Rock Island, backed by Michigan Southern funds, became the Chicago and Rock Island, with authority to connect those cities along the route running south of Aurora. The long inactive Illinois Central planned to build from Cairo through Centralia to a Mississippi River location beyond Galena with a branch into Chicago. Still another company was chartered to build from Fulton eastward to Dixon. The little twelve-mile-long Aurora Branch appeared to be straddled in all directions and could either sit on its laurels and operate as a short-line road or immediately secure connections with the new lines.

At this time three struggling non-operative lines, the Central Military Track Railroad Company, the Peoria and Oquawaka, and the Northern Cross each had uncoordinated plans for expansion. Meanwhile Boston financiers had purchased the Michigan Central. New York interests had taken over the Michigan Southern and the two rival lines were engaged in a battle to push through from east to Chicago. The New York interests attained effective control of the Chicago and Rock Island heading west so the Boston interests immediately started to buy into the Aurora Branch, not want-

ing to be left without potential connections to the Mississippi.

With Boston financing, the four small independent lines amended their charters so that they could alter their routes and form a continuous road from Chicago through Galesburg and on to the Mississippi opposite Burlington, Iowa. The Aurora Branch at this time changed its name to the Chicago and Aurora Railroad Company. By 1856 the group consolidated to form the Chicago, Burlington and Quincy Railroad Company with 300 miles spanning the state from Chicago to the Mississippi opposite Burlington and also to the Mississippi at Quincy. By this time the Burlington line along with the Illinois Central, Michigan Central, and the Galena shared the Illinois Central Depot on the lake front.

Although the Burlington today represents an amalgamation of over two hundred individual railroads, two other early ones in the 1850's were of particular note: the Hannibal and St. Joseph referred to as the St. Jo line, whose original directors included John Clemens, the father of Mark Twain, and the Burlington and Missouri River Railroad. The Hannibal and St. Joseph line was notable as the railroad that toted the mail across Missouri to connect with the Pony Express. During the line's first trip on April 3, 1860, over the Hannibal to St. Joseph distance of 206 miles, the mail was carried in slightly over four hours, a record that stood for many years.

The Burlington and Missouri River Railroad was incorporated in 1852 but the Civil



The Peter Clark, above, a wood burner built by Hinckley and Drury of Boston, was one of the first locomotives on the Boston, Concord and Montreal.

PRR

Corporal Trim, a 53,000 lb. American-type freight locomotive built by the New Jersey Manufacturing Co. in 1856, runs on the Pennsylvania main line.

War temporarily halted its construction long before it had reached the Missouri River.

On April 13, 1846, what was to become the world's largest railroad was chartered by the Pennsylvania. Although nearly two decades before, the state itself had undertaken and eventually pushed through a transportation route combining canals, inclined planes and rail from Pittsburgh to Philadelphia, the Pennsylvania Railroad was chartered to cover that distance wholly by rail.

The B. & O. meanwhile had been looking toward Pennsylvania and hoped to be given permission by the state to extend its lines from Cumberland through to Pittsburgh, and in fact the Pennsylvania Railroad charter required that a section of the line must be contracted for and under construction before mid-1847 or the state would give a go-ahead to the B. & O.

Of the 395-mile route to Pittsburgh then existing, 278 miles of the distance were covered by canals, and the only true railroad was the double track section from Philadelphia 81 miles to Columbia. Since an independent railroad would

Since an independent rail link existed between Columbia and Harrisburg, the Pennsylvania went to work on the Harrisburg to Pittsburgh line, a distance of 249 miles. On September 1, 1849, sixty-one miles from Harrisburg to Lewistown was opened with one passenger train going each way daily, making the distance in four hours. Freight trains were scheduled semi-weekly.

The Pennsylvania's former Chief Engineer, John Edgar Thomson, was elected

president of the line on February 3, 1852, and he stressed to his Board of Directors the importance of the new company investing capital in railroads being built by others in Indiana and Ohio. "By so doing," he stated, "we will not only hasten completion of these railroads but we will also have a voice in shaping their routes so as to form connecting links with the Pennsylvania Railroad and thus create feeders for traffic from the West."

The Company's first such investment was in the Ohio and Pennsylvania Railroad making possible extension of its rail service from Pittsburgh to Crestline, Ohio. Then with additional capital it aided the Ohio and Indiana Railroad, joining Crestline to Fort Wayne and Chicago Railroad. These three were finally consolidated to form a continuous Pittsburgh to Chicago 468-mile railroad, by which time the complete Philadelphia to Pittsburgh route by lease, sale and construction was operating three trains a day on 13-hour express schedules and 15- and 17-hour locals.

The Pittsburgh, Fort Wayne and Chicago Railway Company came directly into the Pennsylvania fold later by means of a 999-year lease.

The first through train from Philadelphia to Pittsburgh operated on December 10, 1852, and although canals were eliminated, the state-owned Portage Railroad was used. The slow ponderous Portage Railroad crossing seemed inefficient so the Pennsylvania went to work on its own mountain crossing and about ten miles north of Hollidaysburg on Bald Eagle Creek, where it set up its work shops, the

[illegible]

One fast and one slow daily passenger train are shown, left, for 1850. Today the Pennsylvania serves 13 states.

No standard time added to confusion with Montreal
8½ min. faster than Brockville, 23 more than Toronto.




GRAND TRUNK RAILWAY.

MONTREAL & LACHINE RAILROAD.

THIS PUBLIC ARE RESPONSIBLY IN-
FORMED THAT RAILWAY WILL BE OPENED TO THROUGH-
GUT TO TORONTO.

On MONDAY, OCTOBER 31,
TRAINS WILL RUN AS FOLLOWS:

TRUCKS ON TRAINS.

STOPPING AT ALL PASSENGER STATIONS.

WILL HAVE MONTREAL very early morning (about 5 o'clock) at 7:00
A. M., arriving at TORONTO at 1:00 P. M.

WILL HAVE TORONTO AT 11:00 A. M., arriving at MONTREAL at 5:00
P. M.

LOCAL TRAINS.

STOPPING AT STATIONS.

WILL HAVE BROCKVILLE, only for MONTREAL, at 8:00 A. M.;
returning from BROCKVILLE at 12:00 P. M.

WILL HAVE BRILLIANT, only for BROCKVILLE, at 9:00 A. M.;
returning from BROCKVILLE at 1:00 P. M.

WILL HAVE OGDONVILLE, only for TORONTO, at 10:00 A. M.; return-
ing from TORONTO at 4:00 P. M.

The Trains will be run on Montreal Time, which is
15 MINUTES faster than Newville Time.

| | | | |
|----|---|---|----------|
| 10 | " | " | Quebec |
| 11 | " | " | Montreal |
| 12 | " | " | Toronto |

Freight Trains will not run between Montreal and Toronto during
the first week.

Fares between Toronto and Montreal:

| | |
|-------------|--------|
| First Class | \$1.00 |
| Second do | .50 |

J. B. HEDDER, General Manager.

Montreal, October 18, 1884.

RAILROADS, &c.

MONTREAL & LACHINE RAILROAD.

FALL ARRANGEMENT.

ON and after THIS DAY until further NO-
TICE, Trains will leave at the undermen-
tioned hours (Sundays excepted)

| FROM MONTREAL. | FROM LACHINE. | |
|-------------------|------------------|--|
| 7 1/2 A. M. | 14 A. M. | |
| 11 A. M. | 12 M. | Or on the arrival of the Steamer which may be due and in sight. |
| 3 P. M. | 2 1/2 P. M. | |
| 4 1/2 P. M. | 5 P. M. | |
| 6 P. M. | 6 1/2 P. M. | |
| 7 1/2 M. | 7 1/2 A. M. | |

ON SUNDAYS

| FROM MONTREAL. | FROM LACHINE. | |
|----------------|------------------------|--|
| 10 1/2 A. M. | 11 A. M. | |
| 5 P. M. | On arrival of Steamer. | |
| 7 do | Do do | |

Freight carried at very low rates

JNO. FARROW,

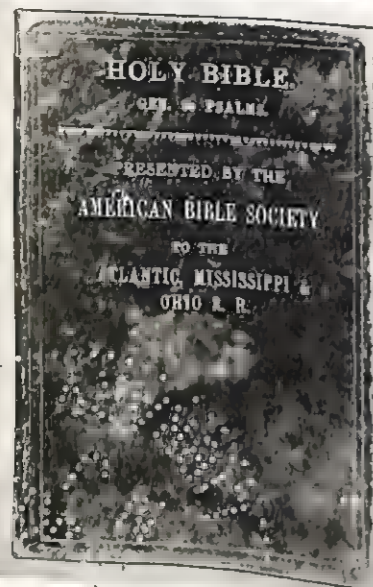
Supr. & Trkr.

Montreal, Sept. 17, 1885.

172



Pony, an 0-4-0 wood burner typical of the ornate engines of its day, had a whale-oil headlamp similar to the single candlepower model, below, used on Newfoundland locomotives.



A Vermont law of 1850 required conductors to read Sunday scriptures to passengers from train Bibles.
CNRS
90

parently he was an eloquent speaker for he outtalked the three-hundred-man Boston delegation and persuaded the Montreal Board of Trade to postpone any definite arrangement. His next move was to propose a peculiar race, the result of which was to determine the course of the railroad. Two letters were placed on separate steamers of similar speed potentials. The two steamers moved out of Liverpool, England, on signal at the same time, one heading for Portland and one for Boston. Whichever letter was to arrive first at Montreal would decide the terminus port for the Canadian railroad. Bets amounting to thousands of dollars were placed by enthusiastic Montrealers as well as by champions of the two cities. Both steamers arrived at their respective ports on March 29, 1847. At Portland, Orin Hobbs strapped the Liverpool-Portland-Montreal letter in a waterproof packet on his back. Riding frantically he reached Gray where he changed horses and headed northwest to Poland Springs. On a new mount he galloped on to Shaker Hill and Welchville. There he took over a horse and carriage to South Paris, Woodstock, North Rumford, and finally Uptown, one hundred miles from his starting point. The exhausted Orin Hobbs there turned over the all-important letter to another rider who dashed on to Colebrook, Richmond and Longueuil. Another rider took over and rode until he, too, was exhausted. Finally at a predetermined point on the Canadian border, G. G. Waterhouse, a veteran and daring Canadian stage driver, accepted the letter for the last leg of the trip.



America's longest railway bridge spans the St. Lawrence River between Montreal and St. Lambert. The 1859 version was called the Victoria Tubular Bridge and enclosed its 9,155 ft. length by steel plate sides.

Waterhouse was a natural showman and had attired himself in a wolf skin overcoat, fox fur cap and bearskin robe for the occasion. A specially selected team of four white horses were hitched to his stage. Hundreds of Montreal railroad enthusiasts were on hand as he dashed down for the final leg using the frozen St. Lawrence River as a fast road bed.

Portland won by a four-hour margin and within a week construction started at the Portland end of the line. The American section of the international railroad was called the Atlantic and St. Lawrence and the Canadian portion was called the St. Lawrence and Atlantic. On July 18 the two lines were linked at Island Pond and on that day the first train ran over the world's first international railway which the following year was leased to the Grand Trunk for a period of 999 years.

In 1854 the tremendous Victoria Tubular Bridge at Montreal was completed and two years later train service was possible from Portland through to Toronto. The original structure was a single track completely enclosed sheet iron tubular bridge with a total distance from bank to bank of the St. Lawrence of 9,155 feet. The fully enclosed structure led to considerable discomfort, gagging and near asphyxiation by passengers so that about 1860 a 20-inch wide split was cut in the tube for its full length to permit the escape of smoke from the balloon-stacked locomotives.

At about that same time John A. Roebling was at work on his railway suspension bridge between Niagara Falls, Ontario, and Niagara Falls, New York, over which the

first train was destined to pass on March 18, 1855.

In 1859, the Chicago, Detroit and Canada Grand Trunk Junction Railway was leased to the Grand Trunk Railway for 999 years. This supplied connection with the Michigan Central at Detroit and gave an outlet for the Grand Trunk westerly from the St. Clair river to Chicago.

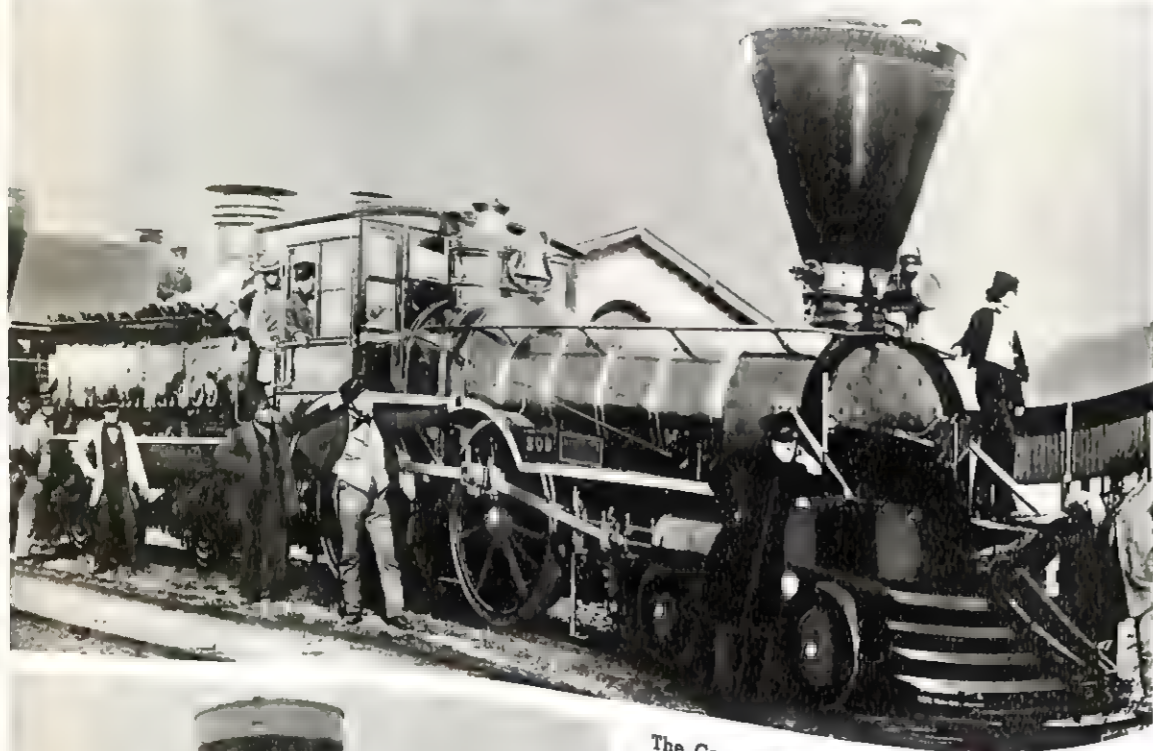
The old railroad gauge problem existed in Canada as well as in the United States. The Atlantic and St. Lawrence or vice versa had been built with a 5-ft. 6-in. gauge and the same gauge was adopted by the Grand Trunk line in Canada. Interchange of traffic to the 4-ft. 8½-in. English gauge used on many United States lines presented problems. At certain points a third rail was resorted to. At others the bodies of the cars were hoisted and different gauge wheels were installed, causing lengthy delays and considerable expense. This, of course, was only necessary for freight shipments, for passengers could readily enough alight and transfer to different gauge passenger cars with no great inconvenience. So great was the problem in the rail hub of Toronto that four parallel rails were laid one time on this single track line, making it possible for locomotives and cars of three different gauges to operate over the single track line.

Much of the early international line was built with strap rails and such was the fear of snakeheads that double-decked cars were tried out for more timid passengers. These top-heavy coaches frequently flopped over, however, injuring passengers from a new direction.



An 1860 Grand Trunk Railway coach featured wood stove, quaint baggage racks, oil lamps.

A bridge across the gorge at Niagara Falls had upper level for trains, lower for wagons in 1855.



Puffing across a bridge and up the grade at Altamont, 2,620 feet above sea level, is B. & O.'s first through train to the Ohio River. End of this run is recorded in authentic old photo, lower left.

THE FIRST THROUGH TRAINS

More than \$15,600,000 was spent by the B. & O. before its first all-through train made the trip from Baltimore to Wheeling on the banks of the Ohio River. The ideas of the Thirties of merely bridging the mountain chains to link the eastern seaboard with the navigable rivers of the interior by now had changed. The B. & O. once content just to reach the Ohio border now saw its rival cities of Philadelphia and New York pushing on through toward the important Midwestern cities, and the pioneer B. & O. realized that it had to overcome quickly the advantages being enjoyed by its rival roads to the north. Fortunately for the B. & O. it had a valuable ally in the Central Ohio Railroad, which was building from Bellaire, Ohio, across the river from Wheeling to Columbus. By 1854 by means of ferrying its cars the B. & O. was able to extend its traffic to Columbus and on to Cincinnati.

In 1851 the B. & O. took a cue from the

Pennsylvania and sponsored the Northwestern Virginia Railroad, which was to build west from Grafton at the point where the B. & O.'s main line turned north toward Wheeling and extend to Parkersburg on the Ohio River where a ferry would take it upriver to Marietta to form an eastern terminus for the Marietta and Cincinnati Railroad, then already under construction. The B. & O. put up about one-third of the \$5,500,000 needed and construction begun in 1852 was completed on May 1, 1857.

At the same time the B. & O. supported the Ohio and Mississippi Railroad linking Cincinnati and St. Louis which on its completion in June of 1857 formed a link between St. Louis and the east coast, fifty-two miles shorter than on any other projected line. Steamers from the east bank of the Mississippi made the final jump across the river and in that one year the American Central Line, as the four roads making up the route were called, hauled nearly 203,000,000 ton-miles of freight.



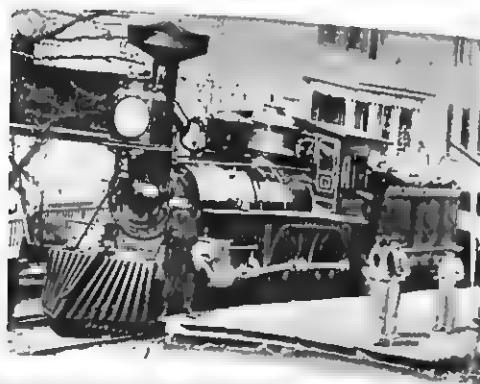
The Grand Trunk locomotive Trevithick was built in the Grand Trunk railroad shops in 1859 and was used to haul the royal train with the Prince of Wales, later King Edward VII, in Canada, 1860. CNRS

Key officials and guests pose on the flag-decorated locomotive at the end of Baltimore & Ohio's first through run to the Ohio River. Here it connected with the Marietta and Cincinnati RR. B&O



Pictured below in an 1880 photo is the Scott, a 4-4-0 with capped stack, Louisville & Frankfort RR.

L&N



Poster of 1851 after completion of New York-Dunkirk line stresses steamer connections to points west.

cluded a two-mile wood-framed bridge over a cut on the Watertown approach. On the day of the initial run, Mike O'Hara, a machinist who was pressed into service as engineer, was skeptical about operating the locomotive across the untried Richard's Cut bridge. Firmly convinced that the bridge would not support the weight of the locomotive, he jumped off at the beginning of the two-mile stretch and let the engine make the crossing unattended as its fireman frantically tried to get it under control. Much to Mike's embarrassment the bridge withstood the load.

On April 20, 1857, Wisconsin had been crossed and Lake Michigan linked with the Mississippi at Prairie du Chien. The celebration on the banks of the river was a tremendous one with the locomotive whistle screaming and a Mississippi steamer at a nearby dock answering with blasts from its own whistle. But jubilation was fairly short lived. Trouble between the North and South was reaching a boiling over point. Political unrest throughout Wisconsin had its reflection on the railroad with a sudden and general lack of confidence in business. This, combined with the aftermath of the 1857 panic, caused the railroad's lines securities to tumble. In 1860 at the river's edge, like other railroads hammering at the West, the Milwaukee and Mississippi was doomed never to cross the river. On May 24, 1860, the company defaulted on its mortgages, a receiver was appointed, and foreclosure proceedings were started against a line not yet ten years old.

L&N

Green River Bridge, near Munfordville, Ky., was
America's second largest iron bridge in 1859.



Illinois had long been in the railroad building business. The Galena and Chicago Union (now a part of the Chicago and North Western) was completed as far as Elgin, 42 miles from Chicago, in 1850. The Aurora Branch and the other independents making up the Central Military Railroad Track Company, later to become part of the Burlington, were at work on their routes which would reach the Mississippi at Quincy.

When the Illinois Central Railroad Company was chartered February 10, 1851, it was given authority to build and operate a railroad 705 miles in length—more than twice the length of the longest road then existing in America. A part of the conditions by which it was given its grant of over 2,500,000 acres of public land was that the railroad should be completed within a period of six years and that no railway land granted was to be offered for sale until the Federal government had disposed of all of its land within a distance of six miles of the railroad at a figure of at least \$2.50 an acre, double its value at the time of the grant.

Ground was broken simultaneously at Chicago in the north and Cairo, Illinois, 366 miles to the south where the Ohio joined the Mississippi.

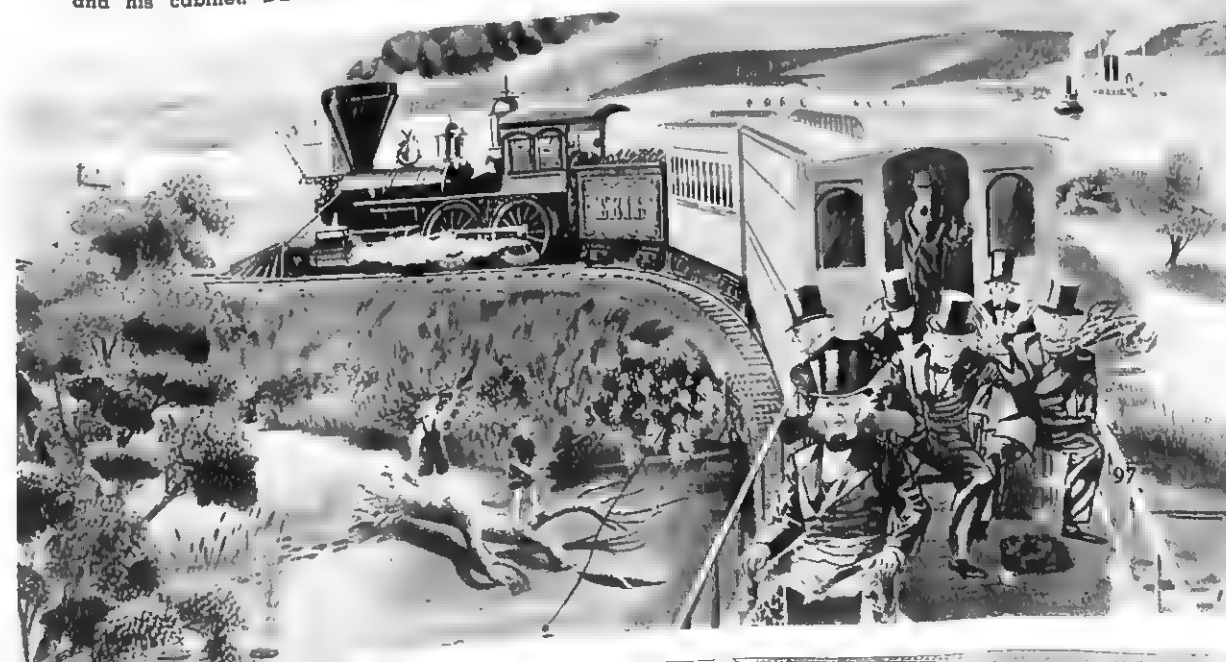
The Board of Directors of the Illinois Central Railroad Company read almost like a Who's Who in American finance at that time. The group included Morris Ketchum, a Connecticut Yankee who was head of the banking house of Ketchum, Rogers and Belmont of New York and the locomotive manufacturing company, Rogers, Ketchum and Grosvenor of Paterson, New Jersey.

Ketchum had been one of the organizers and a backer of the New York and New Haven Railroad. Jonathan Sturges was an importer and coffee merchant in New York City as well as a stockholder in the New York and New Haven Railroad. Robert Schuyler, President of the New York and New Haven; David A. Neal, Salem, Massachusetts, an East Indies shipping merchant, president of the Eastern Road of Massachusetts and a director of the Reading Railroad; George Griswold, Lyme, Connecticut, importer and ship owner in the China trade; Robert Rantoul, Jr., Massachusetts law partner of Daniel Webster; Gouverneur Morris, New York banker and railway promoter; Franklin Haven, Boston financier; Leroy Wiley, importer and merchant with business in New York and Charleston, South Carolina; John W. Alsop, New York steamship operator and promoter of the Panama Railroad; William H. Aspinwall, president of the Panama Railroad, ship builder, merchant and steamship entrepreneur; Henry Grennell, New York importer, merchant and promoter, and Major John Sanford, fur merchant of St. Louis and New York. These men, plus Governor A. C. French of Illinois, made up as prominent a Board of Directors as any railroad ever boasted.

Surveys of some of the older railroads were not always as precise as one might expect. For example, when the Illinois Central was plotting its routes north out of Clinton, the line surveyors finding the terrain a little too rugged for horseback had resorted to mules. They had surveyed a stretch of about fifteen miles over a not-too-promising, extremely hilly route when

Erie

Opening of the New York & Erie on May 14, 1851, was celebrated by a 427 mile trip for President Fillmore and his cabinet. Daniel Webster insisted on an open-air car and is shown wrapped in a blanket.





Erie
Residents of Dunkirk, New York, stand on a bluff and watch trains skirt Lake Erie on tracks below.

A typical coach of 1860 is Ohio & Mississippi's No. 122 made by Jackson & Sharp in Wilmington, Del.



IC
No. 1, a locomotive used by the Illinois Central on charter lines in 1850, sports antlers on bell.

Though Erie locomotives were giants on their 6-ft. track, this "Dolly Vardun" stack is exaggerated.
Erie



the mules bolted and headed back for Clinton. In trying to catch the mules, whose animal sense was apparently a little more acute than the humans', a somewhat shorter and far flatter route was discovered so that a group of runaway mules were responsible for at least one railroad survey.

Robert Rantoul, Jr., in preparing cost estimates in 1851 figured that the 705-mile Illinois Central could be laid single track and equipped with locomotives for \$28,465 a mile, for a total cost of \$20,067,825. When the railroad went into operation over its full distance in 1857, although still far from complete, it had cost \$23,500,000 and more than \$27,000,000 by the end of 1860. However, this compared very favorably with the cost of Eastern roads at the time which averaged about \$80,000 a mile.

Like all railroads of that period, the Illinois Central had some amusing incidents occur because of antagonism toward railroads. The Illinois Central's lines were planned to run from Cairo to Centralia where they would branch, Y-shaped, with one line heading northeast through Vandalia, Urbana, Kankakee and into Chicago. The other fork of the Y was to follow a line north through Decatur, Bloomington, LaSalle, Mendota, Freeport, and thence over to the banks of the Mississippi opposite Dubuque after passing through Galena.

Galena's city council objected to the sur-

vey and the line's chief engineer, Colonel Roswell B. Mason, was forced to carry the road through the hills on the outskirts of town rather than by way of the simpler route along the river banks. This involved a tunnel 2400-feet in length, many tight curves, shaky timber viaducts, and in general a pretty rickety arrangement. One particularly antagonistic citizen publicly announced that he would shoot the first engineer who tried to drive a locomotive over the Galena stretch. When the day arrived in 1854 for testing the line, none of the Illinois Central engineers volunteered to drive the first locomotive and in fact balked at the suggestion. Jim Clarke, then superintendent, later to become president of the line, offered a bonus of \$100 to the first engineer to cover the distance safely. Still no volunteer could be found. Finally Clarke approached Sean McBride who had a reputation of being the toughest of the throttle pushers. Reportedly Clarke doubled the bonus but still McBride refused until finally Clarke agreed to pay Sean's widow \$1,000 if the trip didn't come off in a healthy fashion for the engineer. McBride chugged safely through and presumably collected his \$200—whether in railroad script or cash isn't known.

Probably no line had greater trouble with illness, even including the Norfolk and Petersburg, for during 1854 and 1855, Mason's laborers, mainly Irish immigrants



The Boswell C. Nowell of 1852 was No. 135 on the Erie Railroad. Oil lamps had been introduced in 1850, and the huge square lamp on this locomotive and the one below are typical of this period.

Erie

The Fred E. Merrill, built in 1848 for the Milwaukee & Waukesha, is pictured at the Waukesha depot with its train crew after more than twenty years of track service.

C.M.SP&P



driven to America because of the Potato Famine, died like flies from the dreadful epidemics of cholera. In the summer of 1854, 1,184 Chicagoans died, and in the then little town of Shelbyville with a population of 1,500, 200 died of cholera and all but five families fled the town. Railroad workers who escaped cholera died of milk fever. Still, in that year, 295 miles of the road were open for operation.

In January of 1855 a continuous route from Galena to Cairo was opened and by June 11, the rails had reached the Mississippi opposite Dubuque. The Chicago to Cairo Branch started full operation that same month and the longest railroad on the American continent, nearly twice the length of the New York and Erie, was completed five years and eight months after the company had received its charter. By a unique provision in the railroad's charter, every governor of Illinois has served as a member of the Board of Directors of the Illinois Central, a rather wise move in view of the fact that the Illinois Central has continued to represent one of the state's largest private enterprises.

The most expensive single project on the entire Illinois Central through 1860 was a 32,500-ft. long breakwater along the Chicago water front from the banks of the Chicago River west to 26th Street and then south to Hyde Park. The system of sea walls made up by 12 by 12-in. timbers

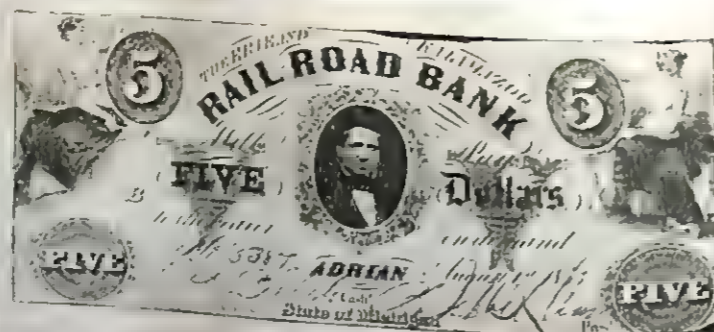
cribbed together and filled with huge blocks of stone cost more than all of the bridges erected on the original 705-mile railroad.

It is of interest to note that although George Pullman is usually referred to as the pioneer constructor of sleeping cars, in 1855 D. J. Townsend of the Buffalo Car Company, Buffalo, New York, built a fleet of what were then called Gothic cars from designs prepared by Colonel Mason. These cars were nearly 50-ft. long, 10-ft. wide and were fitted with staterooms and sleeping booths. The first six arrived from Chicago on June 6, 1856, and by July 1, 1856, the stateroom sleeping cars were in regular service between Chicago and Cairo and later that same year between Chicago and St. Louis on the luxurious *Lightning Express*. This was three years before George Pullman was to convert a passenger coach to a sleeping car and nine years before he was to build his first sleepers specially designed from the wheels up. The most amazing feature of the Townsend Gothic cars was the small washroom. This was equipped with mirrors and marble washbowls. Although by this time conductors had lost their little racket of selling water at a penny a cup, the only water to be found on most passenger cars of the period were the oak kegs with brass spigot and tin cup on a chain, fastened to the wall at one end of the coaches.

Banking privileges, including the printing of money, were still allowed railroads through 1880's. Right is example.
NY Central

IC

Healthy climate mentioned in the 1853 broadside below did not prove so for hundreds of railroad workers who died of the cholera.



WANTED! 3,000 LABORERS

On the 12th Division of the
ILLINOIS CENTRAL RAILROAD

Wages, \$1.25 per Day.

Fare, from New-York, only - \$4.75

By Railroad and Steamboat, to the work in the
State of Illinois.

Constant employment for two years or more given. Good board can be obtained at two dollars per week.

This is a rare chance for persons to go West, being sure of permanent employment in a healthy climate, where land can be bought cheap, and for fertility is not surpassed in any part of the Union.

Men with families preferred.

For further information in regard to it, call at the Central Railroad Office.

173 BROADWAY,
CORNER OF COURTLANDT ST.

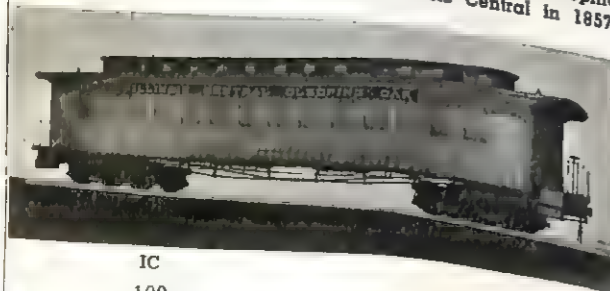
NEW-YORK

R. B. MASON, Chief Engineer.

H. PHELPS, AGENT,

July, 1853.

The Amboy, below, one of the earliest of sleeping cars, was used on the Illinois Central in 1857.



IC

100

CHICAGO TO ROCK ISLAND TO IOWA CITY

The railroad, however, that was to be first to bridge the Mississippi was the Rock Island and LaSalle Railroad Company, incorporated February 27, 1847, with a capital stock of \$300,000. Rock Island was then a tiny village located on the banks of the Mississippi across the river from another small Iowa town, Davenport. The city itself, built on an island, separated from the mainland by what was called the Slough, had been the site of Fort Armstrong, an army post built in 1816 and abandoned in 1836. The little town's original and most prominent citizen, Colonel George Davenport had, because of altercations with neighbors, joined with half-French Canadian, half-Indian Antoine LeClaire, to lay out the Iowa town to which Davenport gave his name.

The new rail line from Rock Island to LaSalle, Illinois, designed to link the Mississippi and the Illinois Rivers was planned in Davenport's parlor, but a month after plans had been formulated and several weeks before the line was to get its charter, Davenport was murdered in that same room. His associates went ahead with the idea and the \$300,000 was subscribed. But little was accomplished in nearly four years other than a survey. The line was re-chartered February 7, 1851, as the Chicago and Rock Island Railroad with eastern financial interests pushing it.

Construction started at Chicago and by 1852 forty miles of line were opened to Joliet. John B. Jervis, instrumental in bringing the Stourbridge Lion to America and builder of the Honesdale, Pennsylvania, track, later chief engineer for the Mohawk and Hudson, designer of the locomotive *Experiment*, and builder of the Saratoga and Schenectady Railroad, was brought west as president of the line. On October 10, of that year, a 4-4-0 locomotive, the *Rocket*, built by Rogers of Paterson, was hooked on to six brand new gleaming yellow coaches and made an un-



C.R.I.&P

First bridge across the Mississippi was opened by the Chicago & Rock Island at Davenport, Iowa, 1856.

eventful trip from Chicago to Joliet in two hours. And since no turntable was available, it backed the whole 40 miles to Chicago on the return trip where the passengers then were driven by carriages to the Sherman Hotel for an inaugural banquet.

As the Chicago and Rock Island moved on through Morris into Ottawa about half way to its goal in 1853, the citizens of Davenport suddenly got the railroad fever and the Mississippi and Missouri Railroad Company was chartered, although it wasn't until the following year that the first Iowa rails were laid.

Uneventfully the C. and R. I. pushed on into LaSalle that same year and there ran into its first serious difficulties. It seemed that Samuel B. Reed, construction supervisor for Jervis, planned his line to follow along the foot of the bluffs at the Illinois River's edge. Prior to Reed's survey, however, a group of LaSalle's principal citizens ever, had heard a rumor that the line would be built across the top of the bluffs and had quickly bought up this property for prospecting, hoping to reap a tremendous profit. When they found that they had outsmarted themselves and the railroad was going through at the bottom of the bluff, they started to raise a stink. These few self-interested leaders managed to mold public sentiment against the chartered route would with claims that the chartered route would hinder the town's progress. Their influence was so great they managed to slip an ordinance through the city council providing that every healthy male citizen must stand ready for a call to arms to prevent the railroad from building along its river's edge survey and providing a fine of \$10 for any healthy male refusing to join the city militia in its alliance against the railroad. Progress came to a halt. Jervis finally was forced to obtain a charter amendment from the state legislature.

On June 5, 1854, the 181-mile long stretch from Chicago to Rock Island was completed. But with the Mississippi and

Missouri Railroad moving west, it was considered a must to link the two lines by a bridge between Rock Island and Davenport. Actually as early as 1853, the Chicago and Rock Island directors had formed a separate company to build such a bridge. Stone markers had been erected on the Island and on the Davenport side of the river to establish the building line. Three months after the first train reached Rock Island, a cornerstone was laid and the Mississippi River Bridge was started.

Meanwhile the Mississippi and Missouri Railroad had set Muscatine southwest on the Mississippi as its goal, but Iowa City farther west, then the capital of the state, wanted a railroad so badly its city officials posted a bonus of \$50,000 to the builders if a rail line were completed and a train ran into Iowa City by midnight, December 31, 1855.

So the M. & M. decided to run its line west to Wilton, then branch, with one section running south to Muscatine and the other moving on to Iowa City on the Iowa River. On November 20, 1855, the first train to operate in Iowa made the trip from Davenport to Muscatine. But the line was still not into Iowa City. At 5:00 in the afternoon on December 31, 1855, the rails were 1,000 feet short of the city boundary. The temperature had dropped to thirty degrees below zero but the road builders drove their men on with the job. Huge fires were built for light and warmth. The enthusiasm of Iowa City's citizens was so great that they, too, pitched in to help. Ties were laid on the frozen ground. Rails were spiked into place in the sketchiest possible fashion. At thirty minutes before midnight, the last rail was laid.

The signal was given for the locomotive to move ahead on the final thousand-foot stretch. In their frenzy to get the rails all down, every available man had been pressed into service, including the engineer and fireman, and during the excitement the locomotive had been forgotten. The poor chilled iron beast refused to respond.

After five minutes of vain coaxing, it wouldn't budge. It was then that chains were hooked to the pilot and with pinch bars prying at the wheels and the town's folks pushing, the engine was dragged into the city limits just as the courthouse bells rang out the old year. The bonus was won.

LINCOLN DEFENDS THE BRIDGE

The Mississippi Bridge at Rock Island was built on stone piers of wood and iron combined using the Howe-truss style of construction. On April 21, 1856, the first bridge to span the Mississippi was completed. The following day the locomotive *Fort Des Moines* steamed across the 1582-ft. long structure.

The principal span over the river's main channel was 285 ft. long and turned on a swivel since it was only 35 feet above the mean water level. When opened it gave a 120-ft. wide passage on either side of its pivot point for steamboats. From the first cornerstone laying on, steamboat interests had bucked and threatened the bridge constructors because they felt they were being cheated of a ferry service.

The steamboat interests had, as far as the railroad was concerned, done their damndest to prevent the bridge's construction and had failed. They had managed to get the backing of Jefferson Davis, the Secretary of War, and through Davis had applied to the Federal courts for an injunction against the railroad bridge construction, only to have their injunction turned down by Supreme Court Justice John McLean. The railroad promoters

thought the river shipping group had called it quits.

Fifteen days after regular locomotive traffic had started, on the night of May the 6th, the steamer *Effie Alton* moved up river under cover of darkness. The *Effie Alton* was a New Orleans to Louisville steam packet. It had never before been so far north on the Mississippi. But to the casual observer the *Effie* steaming slowly upstream was just another packet boat on a passenger and freight trip.

As she whistled to signal for the draw to open, then moved on upstream, the bridge tender saw nothing about her appearance to arouse suspicion or even stir his curiosity. Then suddenly about two hundred feet north of the bridge, the *Effie* suddenly helmed hard to the starboard. Her port paddle wheel churned the Mississippi's waters. Her starboard wheel was seen to reverse. Broadside to the current, both wheels stopped and the astonished bridge tender watched the *Effie* sweep relentlessly down toward the closed span next to the draw. The shock of the steamer's striking the bridge pier crushed her starboard paddlewheel frame. The iron and timber bridge structure shuddered on its foundation. Suddenly fire began to glow through the *Effie*'s cabin windows. Minutes later flames burst through the blistered white superstructure and shortly the *Effie* was a flaming torch from bow to stern.

The leaping flames licked at the bridge timbers. One span of the bridge was completely burned away and the pier that the *Effie Alton* struck was severely damaged.

C&NW

A typical view of a large railway depot during the 1850's shows passengers of the day to be a motley group. This sketch of the Chicago station depicts Indians as well as whites waiting for departure time.



The draw pivot had been jammed by the shock and when a heavy windstorm occurred a few days later the draw span was wrenched from its foundation.

The *Effie Alton*'s owners promptly brought suit against the railroad company, claiming the bridge was a menace to navigation. The railroad owners smelled a rat and knew but couldn't prove that the *Effie* had purposely been sent to her destruction by the steamboat interests.

Abraham Lincoln was retained by the Rock Island to fight the case. Trial testimony brought out the fact that had the *Effie Alton*'s engines failed as her captain claimed, she would have drifted harmlessly down through the main channel through the open draw. Lincoln, too, was certain that the *Effie*'s mishap was a carefully planned bit of sabotage and arson. The jury didn't see it that way and Lincoln lost his case. When the steamboat interest again sued the railroad for claims in Iowa, the Davenport district judge also found in favor of the steamboat owners and ordered the Iowa section of the bridge removed, contending that it was a hazard to river traffic.

Lincoln, in spite of losing the first two cases, had pleaded his suit well, urging that the Mississippi, great waterway of trade "extending from where it never freezes to where it never thaws" should not be permitted, however, to block commerce and traffic from east to west. "The east-west current of travel," he said, "has its rights as well as that of north and south."

Lincoln appealed his cases and the two

previous decisions were reversed by the Supreme Court which held that if it did not reverse previous decisions, "no lawful bridge could be built across the Mississippi anywhere nor could harbors or rivers be improved; nor could the great facilities to commerce, accomplished by the inventions of railroads, be made available where great rivers had to be crossed."

The following year on September 8, the bridge was rebuilt and again went into operation. The Mississippi had been crossed for keeps.

By 1860 railroads had been building west of the Mississippi at a number of points. A railroad line had been started to connect Shreveport with Vicksburg. Several lines were heading west out of St. Louis and out of Kansas City (the *Pacific*, first locomotive west of the Mississippi, had run five miles from St. Louis to Cheltenham in 1852).

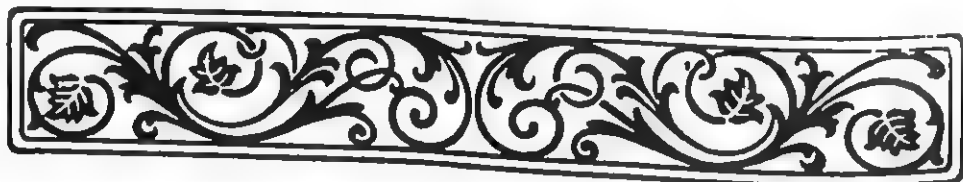
Three railroads were building out of Des Moines, Iowa, and a short line from Memphis to Little Rock had already been established in Arkansas. Yet, though the railroads had now bridged the Mississippi and had notched out a few short routes westward, the huge western area comprising more than sixty per cent of the land area of the United States was unserved by railroads except for 307 miles of line in Texas and 22 miles in California. The Texan line had started at Harrisburg in 1853 when the *General Sherman* rolled into action on August 1, and the California line was opened between Sacramento and Folsom on February 22, 1856. •

SP

L. L. Robinson was the first locomotive in California. Shipped by boat around the horn, it started operation February 22, 1856, on the Sacramento Valley Railroad, now a part of the Southern Pacific.



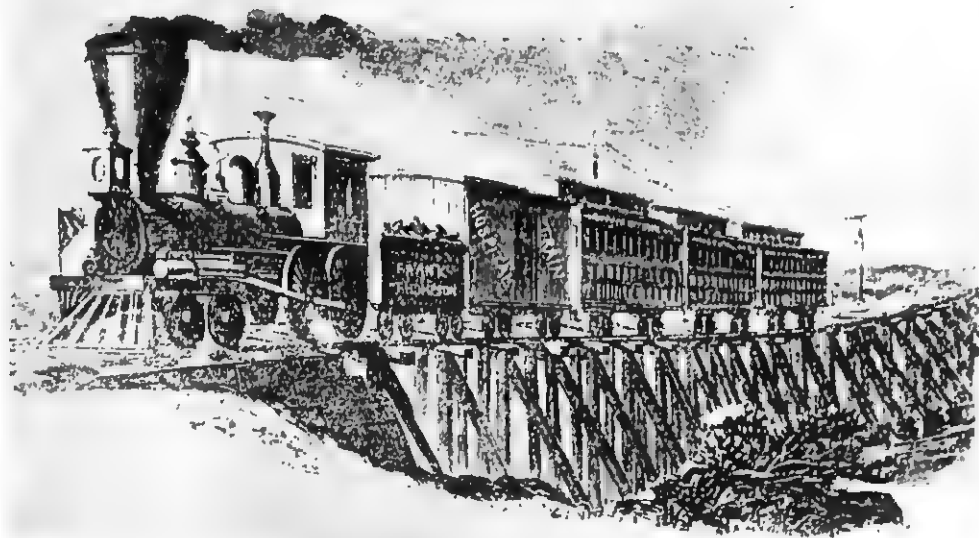
RAILS BETWEEN



DIVIDED STATES



TROOPS ARE MOVED BY RAIL FOR THE FIRST TIME, AND
RAILROADS ARE THE TARGET FOR RAIDS AND SABOTAGE



A hospital train on the Louisville & Nashville RR is shown in this 1862 drawing from Harper's Weekly.

COMPARED to the attention given to even the most minute details of the various battles in the War Between the States, relatively little has been written concerning railroad's part in those fracas. Yet railroads largely determined the location of battles and to a great extent their outcome.


In 1860 the South had 8,855 miles of railroad (mainly 5-ft. gauge) in operation under management of many different companies. The south Atlantic seaboard at Charleston, South Carolina, had been linked with the Mississippi River 755 rail miles away at Memphis, Tennessee, by the South Carolina Railroad, 137 miles long from Charleston to Hamburg; Georgia Railroad, running 171 miles from Augusta to Atlanta; The Western and Atlantic, ranging from Atlanta 138 miles northwest to Chattanooga, Tennessee; the Nashville and Chattanooga, 37 miles from Chattanooga to Stephenson, Alabama; and the Memphis and Charleston Railroad, covering the final 272 miles from Stephenson to Memphis.

The East had been joined with the Southwest by eleven independents creating a 1,215-mile rail route from Alexandria, Virginia, to Mobile, Alabama. The Orange, Alexandria and Manassas carried the line 88 miles out of Alexandria to Gordonsville, Virginia. The 22-mile route from Gordonsville to Charlottesville was run over the Virginia Central Railroad where the Orange, Alexandria and Tennessee R.R. operated to carry on through to Lynchburg. Virginia and Tennessee R.R. operated the 204 miles from Lynchburg to Bristol, Tennessee. The East Tennessee and Virginia Railroad moved the lines 130 miles farther southwest to Dalton, Georgia, was Knoxville where the next 110-mile leg through to Dalton, Georgia, was made over the rails of the East Tennessee and Georgia. Dalton to Atlanta was exactly 100 miles by way of Western and Atlantic Railroad. Parallel and to the south of the Chattahoochee River, the Atlanta and West Point Railroad carried the line 87 miles to the Georgia border at West Point. The

PRR

Harrisburg, Pennsylvania, was a thriving passenger and freight center when hostilities broke out into open warfare in 1861. Photo of railroad station was made in that year.





ILLINOIS CENTRAL RAILROAD COMPANY
OFFER FOR SALE
ONE MILLION ACRES OF SUPERIOR FARMING LANDS,
IN PARCELS OF
40, 80 & 160 acres and upwards at from \$8 to \$12 per acre.
THESE LANDS ARE
NOT STAGGERED BY ANY IN THE WORLD.
THEY ARE
THE WHOLE LINE OF THE CENTRAL ILLINOIS RAILROAD.
For Sale on LONG CREDIT, SHORT CREDIT and the CASH, they are situated near TOWNS,
VILLAGES, SCHOOLS and CHURCHES.

For all Purposes of Agriculture.
The lands offered for sale are in the best of the State, and are of the most fertile soil, and are well adapted for the raising of grain, stock raising, and all other agricultural purposes. The lands are situated in the best of the State, and are of the most fertile soil, and are well adapted for the raising of grain, stock raising, and all other agricultural purposes.

Illinois.
Extending 300 miles from North to South, and 100 miles from East to West, the State of Illinois is one of the most fertile and productive of any in the Union. The lands offered for sale are situated in the best of the State, and are of the most fertile soil, and are well adapted for the raising of grain, stock raising, and all other agricultural purposes.

Grain and Stock Raising.
The lands offered for sale are situated in the best of the State, and are of the most fertile soil, and are well adapted for the raising of grain, stock raising, and all other agricultural purposes.

PRICES AND TERMS OF PAYMENT.
The lands are offered for sale at the following prices: 40 acres at \$8 per acre, 80 acres at \$10 per acre, and 160 acres at \$12 per acre. The lands are offered for sale on long credit, short credit, and the cash.

LAND COMMISSIONER.
Illinois Central R. R. Co., Chicago, Ill.

From 1854 to 1856 the Illinois Central sold nearly 820,000 acres of land at prices ranging from \$5 to \$25 an acre. In 1860, at time of this poster, more than half of the land grant had been sold.

B&O

The Memnon, built in 1848 for the B. & O. by the Newcastle Foundry & Machine Co. of Newcastle, Del., performed such notable Civil War service that it was more frequently referred to as Old War Horse.



The Harpers Ferry Arsenal was a target for raids. Note destroyed bridge and pontoon construction.

B&O

Montgomery to West Point Railroad took over for the 88-mile stretch to the present capital of the state. Pollard was the next step, 114 miles out of Montgomery over the Alabama and Florida Railroad. Final leg was made over Mobile and Great Northern with a stretch of 72 miles of roadbed.

The south Atlantic seaboard at Charleston had also been tied by rails to the Ohio River at Louisville, Kentucky, by the South Carolina, Georgia, Western and Atlantic, Nashville and Chattanooga and the Louisville and Nashville Railroads.

Norfolk, Virginia, was linked to the Mississippi at Memphis, Tennessee, by what today are the Norfolk and Western Railway from Bristol through to Memphis. The New Orleans, Jackson and Great Northern Railway connected New Orleans in the South with Memphis, Jackson, Tennessee, Paducah, Kentucky, and Cairo, Illinois, where it tied with the Illinois Central and moved on through to Chicago.



The Hayes camelback of the Baltimore & Ohio, No. 227, is shown as she appeared during service in the War Between the States.

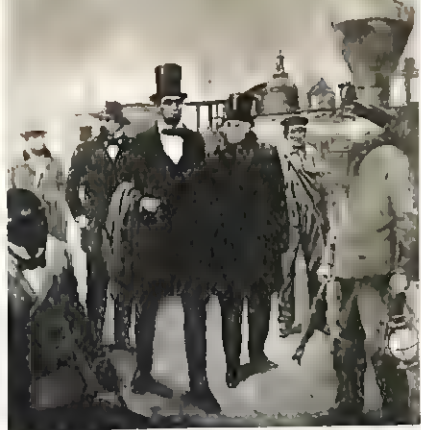
B&O

Other important lines making up the southern network were those running from Richmond, Virginia, through Wilmington, North Carolina, to Sumter, South Carolina, and the Mobile and Ohio ranging north through Meridian, Mississippi, Corinth, Jackson, as far as Columbus, Kentucky. Smaller railroads, none the less vital, for the supply and troop movements for the Confederacy, made up the balance of the South's network.

When Sumter was fired upon the South's over-all rail lines had, in slightly more than a year, increased to approximately 10,000 miles, about equalling the railroad mileage in the area of the United States north of the Ohio River and west of Pittsburgh.

HOSTILITIES HIT THE B. & O.

From the B. & O. railroaders' standpoint, John Brown's raid on Harpers Ferry, October 16, 1859, and his skirmishes with the United States Marines commanded by Colonel Robert E. Lee were as much a



Lincoln arrives at the old Washington B. & O. station for first inauguration.

H. D. Stitt painting—B&O

starting point of warfare as the April 12, 1861, firing on Fort Sumter. Brown and his men after they seized the United States Arsenal also inexplicably stopped the Wheeling to Baltimore Express—a mistake which hastened, if not directly caused, John Brown's capture. In the ensuing excitement of the train blockade, shots were fired. Station Master Fontaine Beckham and a station porter, Hayward Sheppard, were killed. A freight train brakeman was seriously wounded. It was conductor A. J. Phelps who, when the train was finally permitted to move on its way, telegraphed a report to the B. & O. station in Baltimore whereupon B. & O. president, J. W. Garrett, contacted Secretary of War, John B. Floyd, who in turn dispatched Colonel Lee (later to command the Confederate Armies). Lee and ninety marines captured abolitionist Brown.

The B. & O., strategically located as it was to form an east-west link for the Federal government, was subjected to constant

B&O

Wood construction of this B. & O. passenger coach is typical of coach work in the Civil War era. No. 20 is now part of the historical railroad exhibit at B. & O.'s Transportation Museum in Baltimore, Maryland.





Thatcher Perkins, above, was named for its builder at B. & O.'s shops. Designed to haul over heavy mountain grades, it was later pressed into troop-transport service.

B&O photos

Stoves that burned chunks of wood were placed at one end of cars during this period. Heat, but not very much, was offered to travelers, who wore blankets, greatcoats.

Water coolers of the day were provided but were seldom filled and almost never iced. Toilets in trains of the Sixties were a real rarity later added to Pullmans.



destruction. Curiously enough during the first year of warfare, although both troops of the Confederacy and Union soldiers occupied areas along the road, rail traffic was generally unmolested. And aside from small clashes, traffic over the B. & O. operated relatively close to its peacetime schedule and temporarily lulled B. & O. officials and Union leaders into a sense of false security regarding future troop and supply movements. Then on May 25, 1861, the boom of destruction was lowered on the B. & O. when a huge overhanging rock on the cliffs near Point of Rocks, Maryland, was blasted down onto the tracks by Confederate forces. Within a week's time two bridges at Buffalo Creek, West Virginia, had been ripped down and a hundred miles of the B. & O. trunk line between Point of Rocks and Cumberland were firmly in Confederate hands.

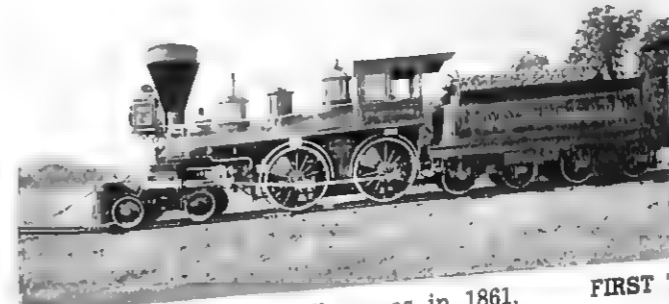
During June and July of that year, a pattern began that was to be followed by both forces. The Martinsburg, West Virginia, B. & O. yards were razed. Fourteen locomotives were confiscated and hauled by teams of horses through to the South. Forty-two other locomotives were sledged

and burned. At least 386 passenger and freight cars were put out of business for keeps. Telegraph lines were torn down. Twenty-three more bridges were destroyed. Additional locomotives were derailed and sent rolling into the Potomac River. Later, Stonewall Jackson's forces totally destroyed forty-one miles of road. From then on to the close of the Civil War in 1865, the B. & O. was constantly rebuilding when the Union forces would recapture the right of way only to have the Confederate forces retake the area and destroy again what had been repaired. In few areas of the entire United States did the ebb and flow of conflict cross and recross any given area so frequently as it did the Potomac Valley. While railroads to the north prospered, gripped when the Federal Government occasionally confiscated a few locomotives for the United States Military Railroads (with promises for future restitution), the B. & O. and lines to the south fought mightily for their very existence.

In October of 1862 a pattern of rail destruction that was to be repeated throughout the South in days to come was worked out by the Confederate forces at Martins-



Old wooden baggage car, shown below, is another exhibit of B. & O.'s Transportation Museum. It was built during war in 1863.



L&N

The Civil War introduced the art of railroad sabotage. The raiding Confederate cavalry did great damage to lines used by the United States Military Railroads. Ties were burned and rails heated and twisted out of shape to wreck roadbed.

B&O



Smith and Jackson of Paterson, New Jersey, built the William Crooks in 1861. It was the first locomotive to run in the state of Minnesota on what was later to become the Great Northern Railroad System.

B&O

FIRST TROOP MOVEMENTS BY RAIL

The accomplishments of railroad men, North and South, was nearly unbelievable. One example of this occurred in September of 1863, when General James Longstreet's First Corps of the Army of North Virginia unloaded from the railroad at Ringgold, Georgia, to enter into the battle of Chickamauga which resulted in the blockade and siege of the Union Forces at Chattanooga. Longstreet's troops had been shifted from Virginia south to Georgia and thence north again nearly to the battle lines by railroads across Virginia and the Carolinas to Branchville, then to Augusta, Atlanta, and on north. Longstreet's troop movement was considered one of the greatest shifts of the army by rail to that time. It was overshadowed only by the transport of General Joseph Hooker's 22,000 men, artillery, mules, horses, supplies for a distance of 1,168 miles in seven days by Colonel D. C. McCallum, officer in charge of Operation of the United States Military Railroads. Hooker's men were moved over the Orange and Alexandria R. R. (now the Orange and Alexandria R. R. (now Southern Railway) by way of Baltimore and Ohio and connecting railroads from

burg, West Virginia. There, as in 1861, recently rebuilt buildings, patched up rolling equipment, engine houses and machine shops were destroyed. But a new fillip was added when the Confederate soldiers made huge bonfires of heaped-up ties, then tossed iron rails on the fires until they had been heated to a pliable condition. The rails were twisted corkscrew fashion around tree trunks so they could not be used again. What the rail twisters used for hot pads isn't recorded. Sherman's forces, applying the same tactics three years later, handled the hot iron with tongs.

The railroad displayed remarkable perseverance. Often lines would be functioning again only a few days after whole sections of track had been destroyed.

A full volume could be devoted to the part played by railway men, railways and specific locomotives or trains on either side of the conflict. Both Union and Confederate forces were called on in some instances to wholly operate strategic railways and to seize railroad property as it was needed. Military strategy was revised to include the potentials of troop deployment by rail for offense or defense.



B&O

Anything that would roll on rails, even a hand car, was pressed into troop service during war.

Southern

Union sentries guard water towers and shops of the Union Mills Station, Orange & Alexandria RR.



Washington, D. C., to Baltimore, thence to Wheeling and on to Columbus, Ohio, and Indianapolis, where they were transhipped on what is now a part of the Pennsylvania Railroad to Jeffersonville, Indiana. Here they crossed the Ohio River on a temporary sponson bridge made of coal barges. Then by way of Louisville and Nashville Railroad and the Nashville and Chattanooga Lines they were carried to Bridgeport, thirty miles from Chattanooga. The enormity of that troop shipment at the time in only seven days is pointed up by the fact that it took Hooker's 22,000 men nearly two months to move the rest of the way on foot into Chattanooga.

McCallum, promoted to Brigadier General as a result of this accomplishment, remained in charge of the United States Military Railroads between the Ohio River and Atlanta throughout the rest of the war. Prior to the Civil War he had been General Superintendent of the Erie Railroad. It was under McCallum's orders that non-stop mass feeding of troops en route was first accomplished. T. T. Eckert, head of the Army's telegraph communications, handled this gigantic chow-down operation. He had been assigned by Secretary of War Edwin Stanton to work with the quartermaster corps on a plan to establish relays of cooks, cooking equipment, and service so that no interruptions to the feeding of troops would be encountered. Under Eckert's direction, the men arrived at Bridgeport fat and ready.

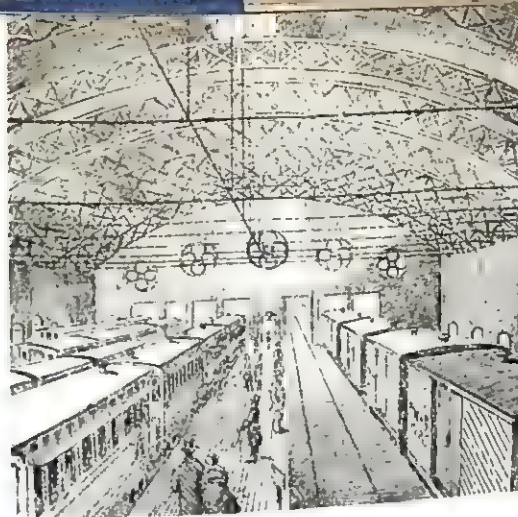
Working with McCallum, too, was Colonel Thomas A. Scott, who had started his railroading career as a station agent with

the Pennsylvania Railroad and who had risen to the vice-presidency of that company before he was called in to serve the Federal Government.

TRAIN WHISTLES WIN A BATTLE

Another railroad very vital to the disposition of troop movements after the great tragedy of civil war befell the nation was the Norfolk and Petersburg, later to be a part of the Norfolk and Western. William Mahone, who had conquered the route's Great Dismal Swamp engineering problems, had, by the outbreak of hostilities, become the president of the N. & P. whose rail head served the port of Norfolk where the important Gosport Navy Yard was located.

The Commandant of the Navy Yard had been called upon by Confederate troops to surrender. Knowing the Confederate forces were scarcely stronger than his own, he had refused and played for time—hoping for help to reach him by water from the north. Word came to Mahone that a convoy of Federal gunboats had arrived and was planning to move up the James River and destroy the railroad's drawbridges. Mahone with a group of volunteer railroad workers clambered aboard flat cars and moved out to defend his company's bridges. The makeshift brigade of defenders crossed the James and found to their surprise that the bridges were intact. After traveling several miles farther Mahone and his men saw no trace of gunboats on the river. Mahone knew that both the Federal troops in Norfolk and the Naval personnel at Gosport had also heard a rumor that Confederate forces from Georgia



The 1861 drawing above shows the interior of the Southern & Western Railroad station at Broad and Pine Streets, Philadelphia. This line was later incorporated into the Pennsylvania Railroad.

and the Carolinas were on their way north by rail to aid the limited Confederate forces holding Norfolk in an attack on the Federal establishments. At that time both Union and Confederate forces were so weak that each was content to stand pat and wait for help.

Mahone had a sudden inspiration and steamed toward the Gosport Navy Yard blowing his locomotive's whistle and ringing its bell at irregular intervals to give the impression of the approach of several trains. He hoped the Navy commandant would assume that the expected troop trains had arrived. The Commandant thought just that and rather than risk capture of his poorly defended location, he abandoned the Navy Yard under cover of darkness. The strategic Gosport Navy Yard was won by the Confederates by a fusillade of locomotive whistles.

Shortly thereafter Mahone entered the Confederate Army as a Colonel. He later advanced to Brigadier and finally Major General, largely as a result of his leadership at the battle of Crater Hill, Petersburg.

This engagement occurred in the summer of 1864 when Grant's forces had laid siege to Petersburg, then defended by outnumbered veterans of Lee's troops. Though outmanned, Lee's men were dug in behind earthworks. To break the Confederate stronghold the Federals had long worked on a tunnel extending from the Federal lines well under the Confederate defenses. At 4.00 a.m., on the morning of July 30, thousands of pounds of explosives carted to the tunnel's heading were set off. The resultant blast tore a huge crater, thirty feet

Southern



The roundhouse and freight yard of the Orange & Alexandria was a vital part of U.S. Military RR.



Passenger coaches were used for troop transport for first time during the War Between the States.

PRR

NY Central

Conductors during the Sixties wore top hats and frock coats. These two were photographed in 1864.





Mail by rail started in 1831. This car is an exact replica of one built and operated in 1862. Burlington

PRR

Hand operated block signals came into use in 1860. This one was used on Philadelphia & Trenton, 1863.



deep and nearly one hundred feet in diameter. Temporarily the Confederate forces were thrown into rout. Railroader Mahone personally led two of his brigades into the fray, recaptured the crater and its Union occupants and restored the Confederate lines.

MORGAN'S RAID

Of all of the rail destroyers, even including General Sherman's direction of southern railway havoc in the stages of the war, probably no single leader compares with the dashing, bearded, fearless, hard-riding rail destroyer of the Confederacy, General John H. Morgan. On Christmas night of 1862, with a chill biting wind cutting across the hills of Kentucky, sprinkled occasionally with flurries of snow promising still rugged weather in the offing, the citizens of Upton sixty miles south of Louisville on the Louisville and Nashville Railroad had buttoned up for the night.

None of them suspected that thirty-seven-year-old Morgan with 4000 men were, at dawn to turn an avalanche of screaming, shooting horsemen on the Federal garrison set up to protect the strategic rail route. This road linked Nashville with Louisville, Frankfort, Lexington and the north, a route that the Union Forces were planning to use to penetrate toward Georgia and one that Lincoln had described as "the gut of the South."

Morgan's first move was to take over the telegraph office. Blandly using the name of one of the Federal commanders, he wired the Union General Boyle in Louisville. gained much valuable information on the disposition of Federal forces and at the same time transmitted misleading data concerning his own whereabouts and the strength of his command.

Merely one bridge destroyed would have made Morgan's raid worthwhile but every bridge on the Louisville and Nashville at



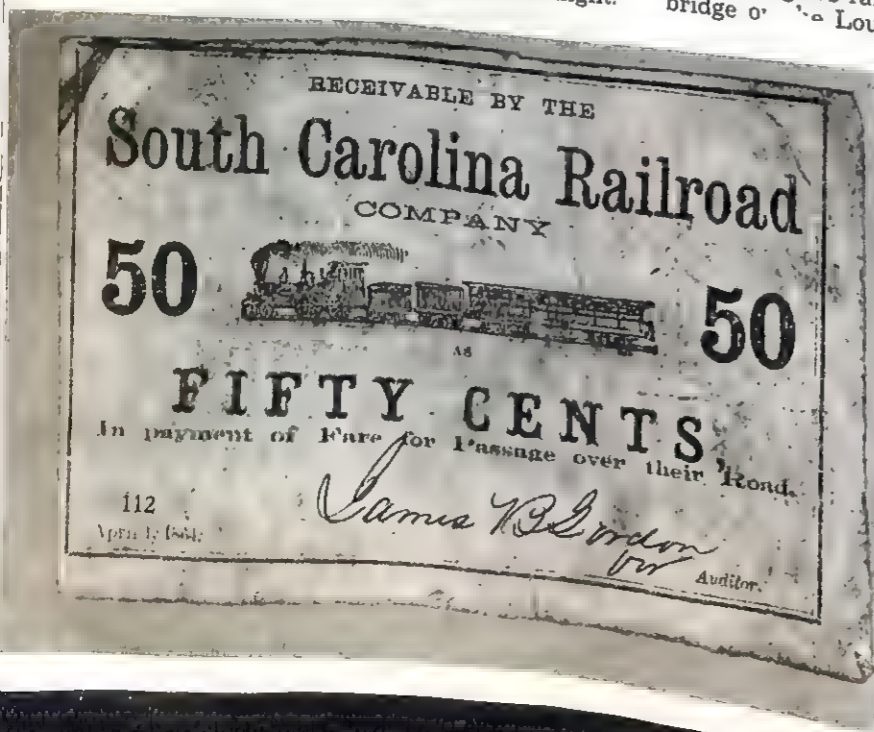
The old Nashville, Tenn., passenger station, with the capitol in the background, was in full operating condition at time Fort Sumter fell.

L&N

that time was fitted with stockades at either end to assure protection against any attacks on the rail routes. The bridge over Bacon Creek, where the present station of Bonnieville, Kentucky, is located, was the first of the "unassailable" strongholds to fall. Throughout the route that Morgan took from Upton to as far northeast as Shepherdsville, he encountered dozens of Federal encampments where small units of 500 to 700 men protected the stockades.

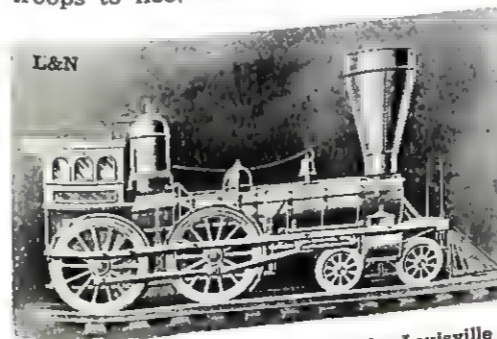
The guard posts were built of heavy logs banked with earth, two stories high with tower elevations affording excellent observation. Despite this rugged construction and strong garrisons behind their walls, Morgan bowled them over and went on to where another bridge was destroyed. From there he moved on Elizabethtown where a regiment of Illinois troops were garrisoned in heavily fortified brick warehouses. Morgan attacked, again forced the troops to flee, destroyed the vital supply

centers and dashed on to Muldraugh's Hill where he burned two long major trestles, being first forced to knock off two additional stockades defended by 700 Indiana troops. Five hundred of his men destroyed stockades and bridges at Rolling Fork despite a surprise attack by 3000 Federal troops. By January 2, when Morgan had withdrawn back beyond Alexandria, Tennessee, he and his men had completely wrecked the Louisville and Nashville Railroad from Upton to Shepherdsville, destroyed vital rail materials plus vast amounts of enemy property and at the same time captured 1900 prisoners. Morgan's raid caused the United States Military Railroads to spend six months in night and day construction to get the line fully opened. It's perhaps ironical that Basil Duke, one of Morgan's most daring lieutenants, later became a leading member of the Louisville and Nashville's legal staff, the very line he at one time helped destroy.



The South Carolina Railroad operated as an important link in the Confederate transportation system. Although the road was primarily used for military traffic, passengers were carried as well. This ticket was used in April of 1864.

Southern

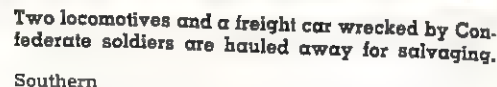


James Guthrie, a wood burner of the Louisville & Nashville, was sold to the U. S. Military RR in 1863.

Military Rail Yards at Alexandria, Virginia, held hospital, troop, and freight cars, in 1863 photo.



Southern

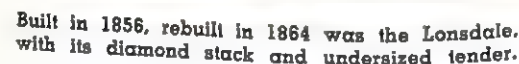


Incidentally, during the War Between the States, the total amount of damage sustained by the Louisville and Nashville according to a report issued in 1865 amounted to \$638,372.56, most of which could be attributed to Morgan's Christmas present of 1862.

ANDREWS' ILL-FATED SABOTAGE

Even more spectacular than Morgan but far less successful was the raid staged earlier that year by an equally reckless Union raider, civilian volunteer James J. Andrews, who, with 21 Union enlisted men disguised in civilian clothes as refugees from the Yankees, set out to destroy the Confederate rail line between Chattanooga and Atlanta with the strategic Chickamauga Bridge a principal target. On April

Cornelius Vanderbilt balked when the U. S. Military Railroads seized some of the New York & Harlem rolling stock. These three telegrams represent Secretary of War Stanton's uncompromising reply.

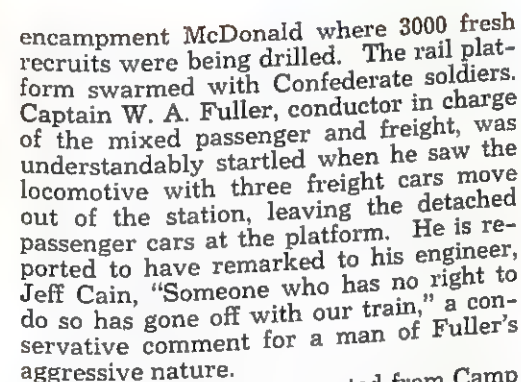


Burlington

12, 1862, the group had boarded a north-bound train at Marietta, a small Georgia town about twenty miles north of Atlanta. No one listening to their conversation would have guessed that they were disguised soldiers of the United States Army under command of General Mitchell, then in middle Tennessee, and were headed south to cut off the South's main supply line.

At Big Shanty, seven miles from Marietta, the train halted and the conductor gave the traditional call, "Twenty minutes for breakfast." Between Big Shanty and Chattanooga to the north there were fifteen bridges. The daring of Andrews' plan is even more appalling in view of the fact that within a very short distance of the Big Shanty stop was the Confederate troop

NY Central



Deserters had been reported from Camp McDonald. The C. O. of the encampment had asked Fuller to be on the lookout for them and to arrest any soldiers attempting to get on the train without passports. Fuller, Engineer Cain and Tony Murphy, who was then foreman of the train's Western and Atlantic railroad shops, assumed reasonably enough that the deserters had stolen the train and would run on up the tracks a short distance to get clear of possible army pursuit and then take to the woods, abandoning the locomotive. Fuller, however, was a proud man. It wounded his pride to have his command stolen practically from under his flowing black beard so he set out on foot and ran two miles to Moon's Station.

The locomotive, *General*, an 1855 product of the Rogers Locomotive Works of Pater-

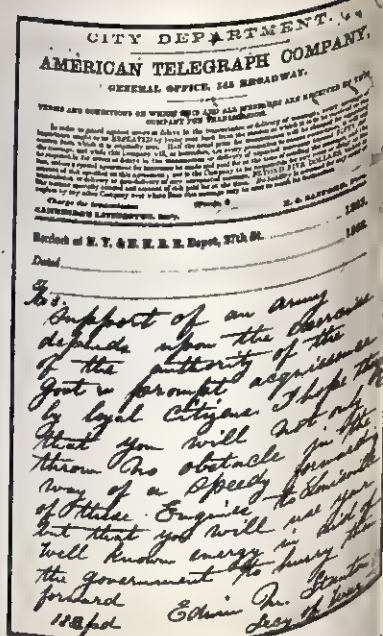
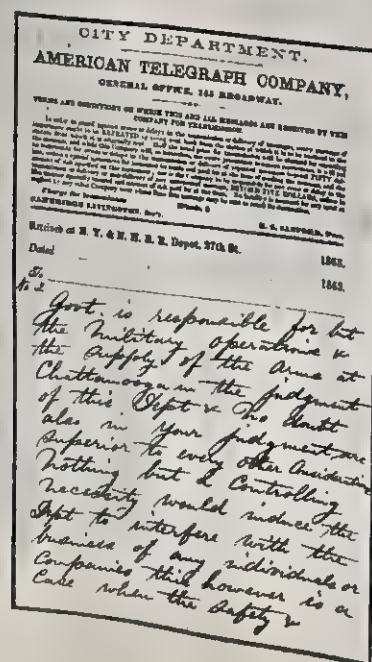
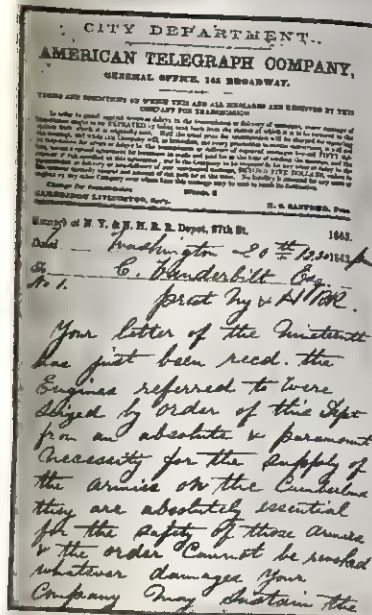
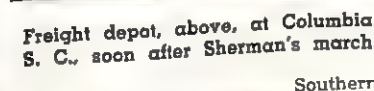
son, New Jersey, was already out of sight. From track hands at Moon's, Fuller heard that there were 24 or 25 men aboard the engine and freight cars—a not too grossly exaggerated estimate. The trackmen further reported that while some of the men gathered track tools and loaded them into freight cars, others cut away about a hundred yard section of telegraph lines. The mention of stealing tools immediately brought sabotage to Fuller's mind. For the first time he suspected that the men might be Federals in disguise.

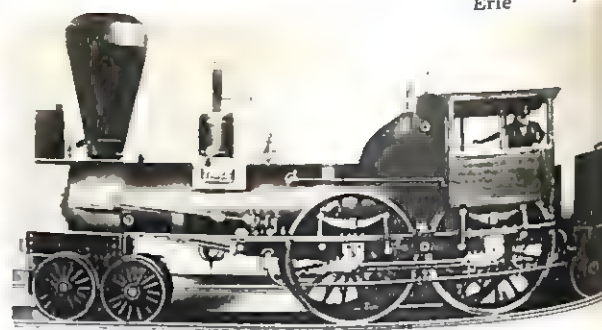
With the assistance of the track hands, Fuller went to work hoisting a hand-car onto the rails by which time Murphy and Cain finally caught up. Fuller was sure that if he and his two cohorts worked hard they could reach Etowah River about the same time the suspect Federal thieves reached Kingston. There he knew that scheduled southbound freight trains would be sure to hold them up. At Etowah River, Fuller knew old *Yonah*, a yard locomotive, was usually steamed up on the sidings at Cooper's Iron Works. About a mile from Moon's Station a short section of track had been torn up. Cross ties were wedged under the rails. The three men lifted their hand car off the rails, pushed it around the obstruction and pumped on toward Acworth. Here they picked up two local citizens and some firearms. Two miles short of Etowah, the five men pumped

Shown below are examples of damage inflicted by Union and Confederate troops. Destroying rail communications became important strategy during Civil War. Northern freight yard is at left; Southern depot, right.



The famous General, 50,300 pound wood burner built by Rogers Locomotive Works in 1855, was stolen by James Andrews for his ill-fated sabotage attempt in 1862 on the Western & Atlantic line, now part of the Nashville, Chattanooga & St. Louis RR.





Tioga, wood burner of the Erie Railroad, had less ornate decorations than most in the 1860-70 period.

Telegraph, No. 84, was built for the Atlantic & Great Western by Jersey City Locomotive Works, 1865.

full speed around a curve and derailed their hand car when it catapulted into an open section of track. The five men were scratched and bruised but within a few minutes they were under way again.

The *Yonah* was where they expected her at Etowah but the tender was turned around backward with a coal car attached. Six Confederate soldiers standing guard at the Iron Works volunteered to join in the chase and with Cain at the throttle, old *Yonah*, averaging nearly sixty miles an hour, backed into Kingston.

There Fuller learned that the tall, top-hatted leader of the fugitives had claimed to be a Confederate officer. He had stated that his three freight cars were loaded with ammunition for General Beauregard then at Corinth. So persuasive was Andrews that the agent gave him a switch key and ordered the blockade of freight trains onto sidings. Fuller, finding his own way blocked by the freight engines and their loads which were again on the right of way ran forward and jumped aboard a locomotive standing on the Y heading toward Chattanooga. From information he had gathered from the Kingston station

agent he figured that Andrews held about a 15 minute lead.

Within a mile beyond Kingston, Fuller and his volunteer crew, which had now grown to nearly a dozen, began to run into ties dropped across the track. Apparently Andrews had gathered a stock of them and was ordering them dumped from time to time as his kidnaped train sped on toward Chattanooga.

Four miles from Adairsville, after stopping at least every half mile to remove obstructions, sixty yards of track was found to be torn out. Making a snap decision, Fuller deserted the stymied locomotive even before Cain could brake it fully and set out at a run calling for the others to follow. At the end of a half mile, the only man still in sight was Western and Atlantic's foreman, Tony Murphy. Fuller apparently was fast on his feet as well as stubborn.

Two miles farther on, Fuller met an oncoming fast freight. He fired his pistol in the air to attract the engineer's attention and fortunately he was recognized by the engineer who stopped the train immediately. Breathlessly Fuller explained the

IC

For four years the Illinois Central was largely a military road supplying Shiloh, Memphis, Vicksburg and other engagements from its old station at Madison Street and Michigan Avenue in Chicago.



The overhead shed of the Erie Railroad station at Meadville, Pennsylvania, is shown in this old photograph taken during latter days of the Civil War.

Erie

situation. Along with Murphy who by then had puffed up to the scene, Fuller raced to the rear of the train and signaled for the engineer to start backing. Two hundred yards farther on, Fuller again hit the cinder fill at a dead run, threw a switch shunting the freight cars onto a side track. He, too, uncoupled the train and ordered the locomotive to back down the right of way.

The pursuit crew now consisted of Fuller, Murphy, Pete Bracken, the engineer; Alonzo Martin, a wood-passer; and Fleming Fox, the fireman. From a standstill they covered the distance to Calhoun ten miles away in twelve minutes. At Calhoun, Fuller spotted the railroad's twelve-year-old telegraph operator standing on the platform. As the locomotive slowed on signal, Fuller extended an arm and scooped up the youngster on the run like a mail sack.

While Bracken and his crew forced the locomotive to its utmost, Fuller wrote General Ledbetter, Commanding Officer at Chattanooga, the following telegram: "My train captured this a.m. in Shanty. Evidently Federal soldiers disguised. They

SP

This tiny 4-4-4, *Liberty*, was first locomotive on San Francisco & Oakland; one of first built in Calif.



are heading for Chattanooga, probably with idea to burn railroad bridges in their rear. If I do not capture them in the meantime, see that they do not pass Chattanooga."

Two miles beyond Calhoun, Fuller sighted the fleeing locomotive *General* for the first time. The disguised Union soldiers had paused and were frantically tearing up rail. When they spotted their pursuers they unhooked one freight car and hastily clambered aboard their runaway train. Fuller ordered Bracken to keep running and slammed into the freight car at half throttle. Since the car obscured the engineer's vision, Fuller clambered forward onto its top where he could get a view of the track ahead, and from his precarious perch guided Bracken with hand signals. A few miles farther on another of the fugitive's freight cars was detached. Again Fuller ordered Bracken to slam into it without slowing down.

At Resaca the two freight cars were pushed onto a siding. Fuller and his crew continued their chase still steaming in reverse since not once during the entire flight had Fuller and Bracken had an opportunity to head their locomotive.

SP

Governor Stanford, No. 1 of the Central Pacific, 1863, is now preserved at Stanford University.



CENTRAL PACIFIC RAILROAD.

NO. 1, TIME CARD No. 1.

To take effect Monday June 6th, 1884, at 5 A. M.

| TRAINS EASTWARD. | | | | TRAINS WESTWARD. | | | |
|-----------------------------|------------------|------------------|-------|-----------------------------|--------------|------------------|------------|
| Frt. and Pass. Frt. & Mail. | | Frt. and Mail. | | Frt. and Pass. Frt. & Mail. | | Frt. and Mail. | |
| No. 1 | No. 2 | No. 3 | No. 4 | No. 1 | No. 2 | No. 3 | No. 4 |
| STATIONS. | | | | STATIONS. | | | |
| 8 P.M. leave | 7 P.M. leave | 12 A.M. | 1 | 6:45 A.M. arrive | 12 A.M. | 6:40 P.M. arrive | |
| 1:50 | 1:15 | 2:15 | 18 | 1:30 | 1:30 | 1:55 | 18 |
| 0:08 | 1:23 | 7:05 | 22 | 1:40 | 1:07 | 1:37 | 22 |
| 0:22 | 1:35 | 7:19 A.M. arrive | 24 | 3 | 7:15 M. pass | 1:44 | 24 |
| 0:40 | 1:50 P.M. arrive | 7:30 A.M. arrive | 26 | 0:45 A.M. | 1:10:30 A.M. | 1:50 P.M. | 26 |
| | | | | | | | Newcastle. |

Trains No. 2 and 3 east, and 1 and 3 west, daily, except Sunday.

Trains No. 1 east and 2 west, daily.

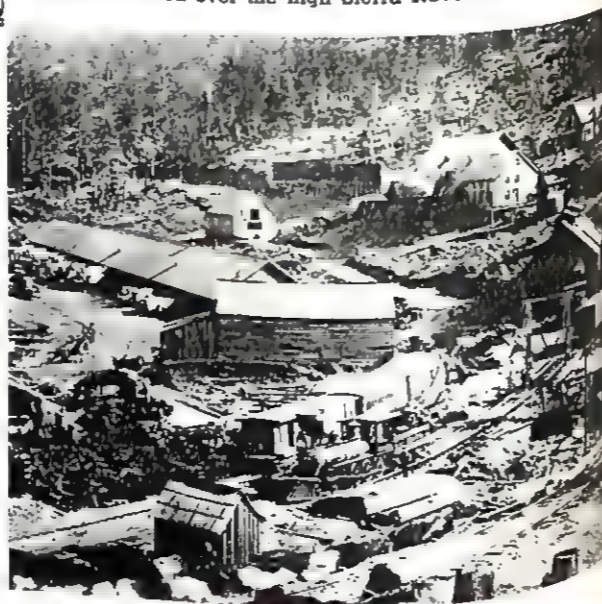
LELAND STANFORD, President.

SP

Fuller's locomotive, the Texas, had been designed by Danforth and Cooke but was at a handicap running backward. Despite that the fifteen miles of hot pursuit into Ringgold and three miles beyond was

SP

SP



The *General's* crew first flung out the last of its store of ties after debating whether to use them for fuel or as a final attempt to derail the oncoming *Texas*. Fuller's men quickly cleared the tracks. They stared aghast as the *General* backed down on them pushing its blazing freight. Fuller was still not beaten. He waved Bracken back, then gently let the burning car touch the tender and signaled Bracken ahead again. Time was running out for



N.C.&SL

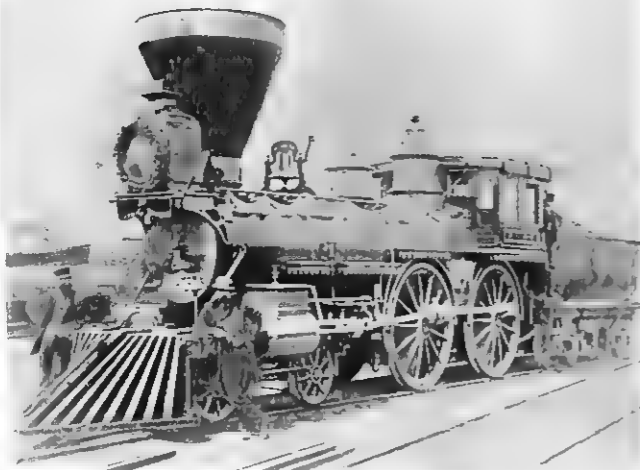
SP

IC



The recaptured chase-weary General was put back into regular service. It was used to haul ammunition to General Johnston in the Battle of Kenesaw Mountain and on return trips carried back wounded soldiers to Marietta. The General, too, was

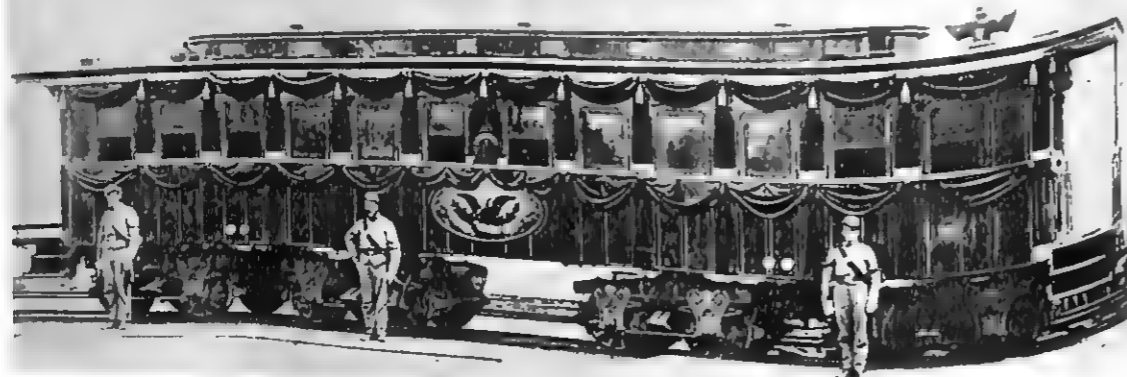
Best remembered were the raids of Morgan and Andrews. The student of the War Between the States will find many other stories of sabotage attempts and adventure in which the iron horse took a part.



NY Central

The locomotive Ruby was festooned with bunting, a welcome from the Boston Board of Trade, and a picture of Lincoln on the headlamp when he visited Boston. Cab had fringes; tender, painting.

Presidential car built for Lincoln by the Orange & Alexandria and Manassas Gap Railroads was never used by him during his lifetime, made only one official journey—carrying Lincoln's body to Springfield.



Southern

RAILROADS AT THE WAR'S END

When the war was finally at an end, hundreds of miles of railroad throughout the South lay in ruins. For example, after Sherman marched through Georgia and turned north through the Carolinas more than seventy miles of the S. C. R. R. was completely destroyed. Only four locomotives, five passenger and baggage cars and 36 freight cars remained in 1865. Depots, rail trestles and rolling stock went up in flames. One raid alone destroyed 13 locomotives and reduced 147 cars to smoldering masses of charred ember and twisted metal framework.

When Federal military control was withdrawn on June 19, 1865, the S. C. R. R. set out to rebuild from complete chaos, with no available funds, heavy debts, poor organization and an undependable labor supply—little more than the pioneer line had had 30 years before.

From the Baltimore and Ohio south, re-

peated destruction, rebuilding and destruction again by either or both forces had been the pattern for nearly four years. The Mississippi Central had lost all but one depot and twenty-seven of its thirty locomotives. The New Orleans, Jackson and Great Northern had been one of the best equipped of the southern railroads. It went into the war with 37 passenger cars, 550 freight cars and 49 locomotives, the largest percentage of which were new or nearly new. At the end of the war, the once proud line was reduced to 36 beaten freight cars, four degenerate passenger cars and two tired locomotives.

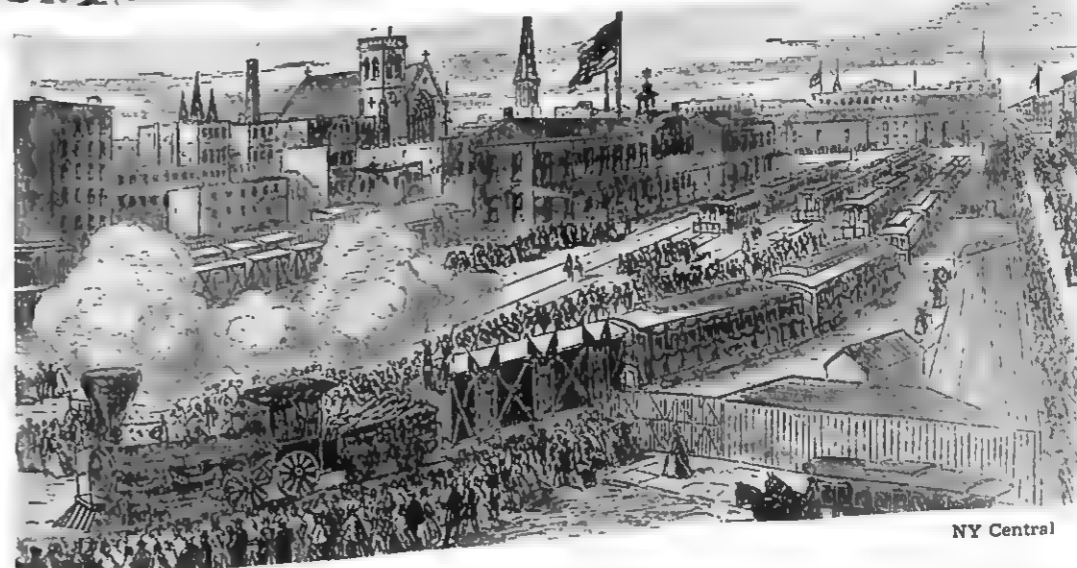
Nearly everywhere throughout the South the story was the same. Where military destruction had not taken its toll, military use and inadequate maintenance had. At the beginning of the Civil War, Confederate paper money and bonds had been generally accepted legal tender. Yet as the shadow of defeat fell on the Confederacy,



PRR

A Pennsylvania Railroad locomotive pulled the funeral train on its long tour. On its way to Springfield it toured much of the East and Midwest.

The contemporary drawing below shows the departure of the funeral train from New York City, a scene typical of other cities along train's route.



NY Central

the value of its paper money dropped from \$1 par in comparison with the Federal currency to 10 cents in the spring of 1865. By the war's close Confederate money was valueless, yet rather than be paid nothing the operating railroads accepted Confederate currency or usually equally worthless promissory notes. The South Side Railroad, for example, a part of what today is the Norfolk and Western Railway, had a stated income for the second half of 1865 of \$675,000 but only \$3,592 was collected in "good money." The balance was in Confederate currency. The officials of that line, like others, had little to offer their workmen other than cornmeal, salt pork, shelter and a promise of future pay. Robert H. Smith, a former president of the Norfolk and Western, stated that he had seen old notations on the railroad's books listing the amount of bacon and cornmeal on hand and dispensed on a succession of dates. Food and promises of payment were

sometimes enough to obtain labor at least when competition in the labor market had nothing better to offer, but new equipment required real money and to get it most of the southern roads floated loans. By 1870 the shock of the war on southern railroads had largely passed. Rebuilding had already been accomplished. Lines were running; new iron wheels were pounding the rails. The future looked rosy, but it was a rare line that wasn't up to its teeth in debt. What looked like a bright future in 1870 was destined to turn grim within three years when the Jay Cooke and Company banking house failed and set off a financial panic and depression more rugged than anything the country had ever before experienced. Each line faced a different set of problems, and there are many times in the history of the prominent railroad lines of today when that success was by no means assured. The war's aftermath weeded out weaklings. •

EAST

MEETS

WEST



GOLDEN SPIKES ARE DRIVEN WITH A SILVER MAUL, AND INDIANS, PRAIRIES, AND MOUNTAINS ARE CONQUERED TO JOIN A CONTINENT



LONG before 1850, Congress was belabored with requests for a rail route through to the west coast by those who hoped to divert some of the lucrative oriental trade to a speedier and less expensive route to the East. After the discovery of gold in California, pressure on Congress increased. Sectionalism was the keynote. Southern politicians quite naturally wanted the projected line to start at some point on the lower Mississippi, preferably at New Orleans, with a dream of making this city along with Memphis, Vicksburg, and St. Louis as large or larger than the thriving metropolitan areas that had sprung up at seaports along the Eastern Seaboard.

There were other Southerners who recognized that the development of a southwest railway would further strengthen an alliance between the South and the West. Jefferson Davis, then Secretary of War, fostered such a move.

Illinois spokesman, Stephen Douglas, talked long and loud for a northerly route visualizing one to extend from Chicago to Oregon. With this in mind, he also maneuvered through Congress the Kansas-Nebraska Act in 1854 which provided that the part of the Louisiana Purchase between the western boundary of Missouri and Iowa and the Rocky Mountains should be organized into two territories, Kansas and Nebraska, with the 40th parallel serving as the dividing line. Meanwhile James Gadsden in 1853 signed a treaty with Mexico which provided for the ceding to the United States of a 45,535 square mile territory for \$15,000,000. The treaty,

L&N

Southern railroads began to rebuild immediately after the Civil War. Nearly all the citizens of Pewee Valley, Ky., turned out for the 1867 opening of Louisville & Frankfort Railroad station.





Executive Mansion.

[illegible]

Abraham Lincoln wrote this letter on November 17, 1863, establishing Omaha as the eastern terminus for start of the Union Pacific.

UP

An 1865 issue of Harper's Weekly shows the capitol grounds in Washington with steam engine at the left and a horse car, right.



Mule train travel from Missouri River to Sante Fe, New Mexico, was 80 to 90 day haul before railroads pushed west over the route.



Sante Fe

the 32nd parallel (latitude), one following the 35th parallel, the 38th and 39th known as the Buffalo Trail, the 41st and 42nd, referred to as the Central, Mormon Route or Overland Trail and one roughly following the 47th to 49th parallels referred to as the Northern route.

Private capital was required for any of these proposed projects regardless of government subsidy. That such financing could come only from northern capitalists or European financiers, who in turn leaned heavily on judgment of the successful Northerners was apparent to the Southerners. So the South's leaders merely threw a political block which stymied any Pacific railway until after the secession by eleven Southern states. The advent of the Civil War weaned the competition to routes fostered by neutral territories or those firmly supporting the Union.

St. Louis and the Missouri interests were still somewhat step-children, too new to

have any great political influence, and ultimately the Chicago interests with New York and New England support prevailed.

THE PACIFIC RAILROAD ACT

On the first of July 1862, Congress passed the Pacific Railroad Act, authorizing the establishment of the Union Pacific R. R. Company, granting a right of way 200 feet wide through public land on each side of the roadbed and 100 feet wide on either side of the roadbed through private property. The Act also granted ten alternate sections per mile of public domain on both sides of the railway. Two years later, a second Railway Act doubled the land grants and gave the United States a second rather than a first mortgage on potential loans of \$50,000,000. President Lincoln, October 19, 1864, established the eastern starting point of Omaha for the central route from Nebraska through to San Francisco.



Burlington



The interior of George Pullman's No. 9 lighted by candles, heated by wood burning stoves, but still an improvement over the earlier arrangements.

NY Central

Rail coach construction has come far since these early three-tiered sleepers with their poor ventilation and lighting. Passengers had to supply their own bedding.



Pullman photos

First Pullman car was old No. 9, converted from a 40-ft. day coach in 1855. It was placed in service on Chicago, Alton & St. Louis.

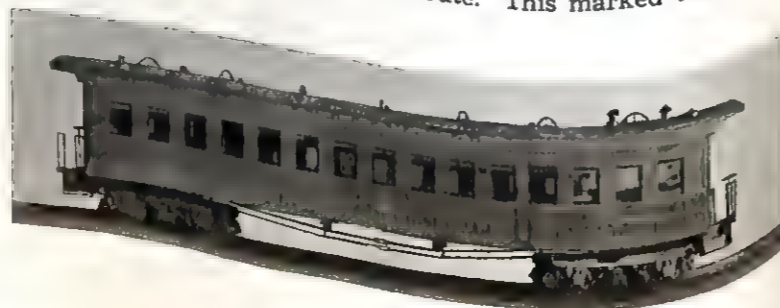
One interesting feature of the Railroad Act of 1862 was the proviso that President Lincoln establish the gauge of the road. Since 5-ft. gauge tracks already existed in California, Mr. Lincoln decided on that gauge. Midwestern rail interests whose lines were largely 4 ft. 8½ in. immediately initiated heated lobbying and Congress finally passed an act declaring that all of the rails through to the Pacific Ocean from the Missouri River over public domain lands should be 4 ft. 8½ in. This Congressional ruling effectively established what has been today's standard gauge—a gauge all major American railroads were finally forced to adopt a decade or more before the turn of the century.

The Union Pacific, chartered in 1862, began construction in 1864. The Central Pacific, also authorized to build eastward from the Coast to meet the U. P., had already been incorporated in 1861. Construction on the Central Pacific at Sacramento began in 1863.

Both railroads were granted subsidies of \$16,000 a mile in a territory which governmental surveys deemed level, \$48,000 a mile for construction through the mountains, and \$32,000 for track laid between mountain ranges. The two companies began a dramatic construction race to see which could pile up the greatest amount of subsidies.

ATCHISON, TOPEKA AND SANTA FE

Also in 1863, Cyrus K. Holliday received a land grant from Congress for 3,000,000 acres in alternate sections of Kansas and the 35th parallel route. This marked the



The first "hotel" cars, sleepers at night and diners by day, were used about 1867 for deluxe travel.

New York Central & Hudson River RR had eight of these elegant sleepers in 1865. Monitor top made possible ventilation without a shower of sparks.



NY Central

The berths in the Pioneer were hinged and folded inconspicuously toward sides and roof for day-time travel. Decorative paneling was car feature.



Pullman photos

The first all-Pullman built car was the Pioneer of 1865. It was considerably higher and wider than regular cars.





Burlington

An 1870 poster, above, of the Chicago, Burlington and Quincy, showed through rail connections from Omaha east to Boston, Portland, Toronto, Montreal.

Here we see actual laying of road bed across the prairies. Unlike earlier eastern lines, steel rails, 56 pounds per yard, were laid on ties of oak.



himself out with the idea of a Santa Fe trail railway for a decade, he was replaced as president of the chartered but still-not-under-construction road by S. C. Pomeroy, a senator from Kansas. This was probably a move of political expediency, for Holliday and Pomeroy remained friendly as Holliday roamed around the country trying to raise funds, though according to records held no official position in the company again until 1868. Official reports and engineers' correspondence seemingly con-

tinued to be directed to Holliday and apparently he was still the prospective road's guiding genius. But it was Pomeroy who came up with the dilly when the March 3, 1873, deadline moved closer with still no construction work started.

Pomeroy fostered a measure in the Senate in 1866 which seemed to be a grasping-at-straws type of maneuver that would permit the Santa Fe to operate a steam "railroad" without rails. In order to obtain approval on this, Pomeroy and the

Burlington

The first bridge across the Missouri River, with a total length of 1,395 feet, was built at Kansas City for the Hannibal & St. Joseph RR. It is shown here as it appeared on its opening day, July 4, 1869.



Sante Fe

Cities of the West sprang up along rail lines, or grew as a result of them. Topeka, below, was expanding rail hub in 1870.

Sante Fe



Santa Fe agreed to a reduction of the original land grant of ten sections per mile to three sections per mile. At this time Santa Fe promoters were becoming panicky and needed a stalling device. The idea was that the Atchison, Topeka and Santa Fe would build a "railroad" but would omit at least at that time the laying of ties and rails and (shades of the 18th of century) would run steam-propelled locomotives with broad, flat-tired wheels capable of pulling 50 tons of freight and cars or a train of 200 passengers at an average of six miles an hour. It was as impractical as suggesting that man could ever fly without wings.

In 1867 George Washington Beach of New York contracted to start work on construction by October 12. Beach was to finance the construction himself and in return was to acquire the right of way on private lands, was to get the entire Congressional land grant and all capital stock then issued other than a very limited amount to be held by the directors. Beach didn't start work and six months later still hadn't started.

At the time the Santa Fe was still in a fetal stage, in the area of what today would be the states of Kansas, Colorado, New Mexico, Arizona and California, there were less than two people to the square mile. The trail from Kansas to Santa Fe was an old one that had been used as a trade route when Santa Fe became an American town in 1846. From Independence, Missouri, on

the state border, the 850-mile trail was by the time of the Santa Fe railroad project a well-defined route. The period was one when almost any new idea was given a try. In 1855, for example, Congress amazingly enough had appropriated \$30,000 for an experiment to bring camels to the United States to be used for transport in the southwest. By 1857 nearly a hundred camels had been imported to a Texas Gulf port. Since they stunk worse than mules and were even more stubborn, after two frustrating years of futilely trying to increase the herd and break them in to hauling four-ton wagon loads, the two dozen or more still surviving single humpers were turned loose in Arizona. What became of them no one knows but maybe today they are providing tantalizing "fossils" for archaeologists.

WEST FROM TOPEKA

The first shovelful of earth on the Santa Fe wasn't turned until October 30, 1868, nine years after Holliday had made his original application for a charter and five years after the Congressional land grants. The route of the line when it was first started was a curious one. Atchison stockholders were distressed since the line originally had been promised to start at Atchison. They were downright irate when, after it started at Topeka, it headed almost due south out of Topeka rather than north toward Atchison. Coal deposits had been located at Carbondale to



Outside Topeka, the way west was a straight line across the plains. Tiny dots in distance are track laborers laying the roadbed.

Sante Fe

SP

Oakland, California's, station is shown in 1869. On November 8th the first train from Chicago and the East was greeted by crowds.



the south and Holliday figured he could pick up freight by going through that town and ignored the Atchison gripes. By the end of March 1869, a bridge had been thrown across the Kaw River and an old 4-4-0 yard dog built by the Niles Machine Works, Cincinnati, Ohio, for the Ohio and Mississippi Road, was bought and cut down from a 6-foot gauge to 4 ft. 8½ in. She was hauled in on Kansas and Pacific track and the first train movement over the Santa Fe was a test run by this former O. and M. locomotive over the 300-foot long double Howe truss bridge over the Kaw.

An incident of antagonism occurred before the line had extended five miles out of Topeka when some anti-railroad property owners built a stone breastworks across the right of way. The blockade was at first a nuisance that turned into tragedy, however, several days later and public sentiment quickly demanded its removal after three teen-agers stole the con-

struction handcar, coasted down the grade near Pauline, hit the stone wall and one of the youngsters died—the Santa Fe's first casualty.

In 1950 the Atchison, Topeka and Santa Fe Railroad Company owned 1,199 steam locomotives, 444 diesels, 1685 passenger train cars and 80,823 freight train cars as compared to its puny start in the latter part of 1869 when its stock consisted of one second-hand locomotive, a battered day coach bought from the Indianapolis and Cincinnati Railroad, 12 freight cars capable of carrying a total of 120 tons of freight and one handcar. At that time eastern financiers scoffed at the Santa Fe and called it a "railroad that starts nowhere and is going nowhere," but ninety years later its rolling stock had covered nearly 55,000,000 train miles, operating over 13,095 miles of track. This was a far cry from April 26, 1869, when the little C. K. Holliday, pulling thirteen Santa Fe

First train equipped with George Westinghouse air brakes for regular service was Penn. locomotive No. 13 and the coach pictured at Altoona shops, 1869.

PRR

By 1870, track laying machines and crews, like this of the Chicago, Burlington & Quincy, had extended the line from Chicago to Lincoln, Neb.

Burlington



Construction superintendent of Central Pacific rides a flat car through Victory, Utah, in 1869. The camp was named for the day the ten-mile rail-laying record made it the Central Pacific line's eastern rail head.

SP



cars plus one borrowed from the Kansas and Pacific to offset an opening day jinx, carried its first official train, the Wakarusa Picnic Special, seven miles out of town and back.

Before 1870 arrived the name Atchison, Topeka and Santa Fe Rail Road had been changed by New York stockholder pressure to National Pacific, but five weeks later the fickle group agreed to take back the original name and the only other change through to the present has been to alter the two words "Rail Road" to "Railway." By September 1869, the Santa Fe Rail Road was open to regular traffic as far as Burlingame, twenty-six miles from Topeka, and by the end of the decade the so-called 35th Parallel route, which actually started at the 39th, was well on its way toward Osage City to the south. The Atchison stockholders on the Missouri River to the north of Topeka became even more teed off at Holliday and his asso-

ciates, and were almost as angry as the directors of the Denver and Rio Grande were to become ten years later when the two railroads' right-of-way dispute failed to be settled amicably and gunplay and bloodshed became commonplace.

But by 1870 the Santa Fe dream bubble no longer was in danger of bursting. It had solidified to a reality of a rail line eventually destined to stretch out spider-like to Galveston in the South, Chicago to the northeast, Denver to the north and San Francisco to the west.

SCHEMING RAILROADERS

In the East there were references to the "suffering Sixties" but this was so much hokum for in the North during the Civil War after the shock of the first few months had passed, a surge of excitement hit the metropolitan areas. Trade was brisk; northern fortunes were being made. Northern railroads had expanded and

One New York depot of Hudson River RR was at Chambers Street in 1868. Passengers traveled to 30th Street main terminal in long horse-drawn cars.



NY Central photos



The New York Central & Hudson River RR, when formed in 1869, was greatest four track line in the world. Roadbed along the Hudson is shown above.



Sometimes six or more locomotives were used by the New York Central on the run between Rochester and Syracuse. These could not always buck drifts.

The first locomotive to be used in Ulster County, New York, was this 4-4-0 model which went into operation in 1868 on the Walkill Valley Railroad. This line later became part of the New York Central.



judging from the increased tempo of social activities in the smarter metropolitan sections, no financial pinch was being felt.

The eastern railroads had moved beyond the building stages. Manipulations for control were beginning. By 1866 the Erie, which seemed destined to be kicked around as a stock football, was under control of manipulator Daniel Drew, who was associated with both Jay Gould and Jubilee Jim Fiske, in operations which were to lead eventually to bankruptcy of the Erie in 1875. Cornelius Vanderbilt now had the New York Central and Hudson River Rail-

road organizations well in hand. He had already imposed a ruling that the once gaily painted locomotives, with ornate, gleaming brasswork, were to be given a dull black monotone finish in interest of economy, a move that was gradually adopted by other railroads and a depressingly dull color scheme largely adhered to for seventy-five years.

The soberness of Vanderbilt-inspired paint schemes didn't eliminate dramatic romance for railroads, however, for the first great train robbery was perpetrated in 1866. John and Frank Simeon Reno, along

NY Central



Diamond stack freight locomotive and funnel stack mixed train stand at the Utica station of Utica & Black River RR in photograph above taken in 1865.

Sante Fe



By 1870, plans for a vast network of rails through the West were well begun. Horse-drawn stages were very much in use, however, for years to come.

This locomotive variation was used by Ben Holladay during construction of the Oregon Central south from Portland, Oregon, in 1869.

SP



with Frank Sparks, boarded an Ohio and Mississippi Railroad train, held off the train crew at gunpoint and made away with two safes containing \$45,000 to set the stage for the more colorful James brothers.

Lorenzo Sherwood in 1867 had pushed his National Anti-Monopoly Cheap Freight Railway League as a stepping stone toward the presidency of the United States. Although Sherwood didn't get far politically, he was able to stir up considerable railroad antagonism among lower and middle-class income groups. Sherwood's idea called for a governmental construction of a vast

seven-trunk line railroad system covering 4000 miles. The project was to cost \$200,000,000. It was to be paid for by tolls and use of the line was to be open to any individual or company to operate cars. When the project was paid for, then Sherwood said it should be open to all free of charge. Railroad directors temporarily forgot their intramural disputes, teamed together to make Sherwood's proposal sound like the ranting of a congenital idiot and Sherwood's scheme folded.

The California gold discovery started a rush westward in '49. The mining fervor



A passenger train of 1870 rolls over the new tracks of the Oregon & California Railroad between Canby and New Era, Oregon, after line was opened.

SP photos



The locomotive Sabine operated on the Louisiana & Texas, a pioneer line that later became part of the Southern Pacific Railroad's Louisiana branch.

NY Central



Winter snowdrifts were a major problem for northern railroads. The New York & Harlem Railroad operated this snow plow during early 1870's.



Photos saved from old stereoptican slides provide some of best records of rails across the West. This wood burner steams past Palisades Canyon, Nev.



The America, built by the Grant Locomotive Works, N. J., was bought by the Chicago, Rock Island & Pacific at the Paris Exposition in 1867. Boiler jacket was German silver.

Ind. R&L Soc.

The open-sided observation car of the Atlantic & Pacific Express was a popular innovation of the day. Running through the Rockies, it offered a good view and fresh air mixed with smoke, cinders.

SP



continued to attract both get-rich-quick panhandlers, merchants and mere hopeful settlers. Shortly after 1860, gold had also been found in reasonably large quantities in the Snake River Valley, Idaho, Humboldt and Emerald areas of Nevada and Colorado and also Montana to stimulate movement to these areas. Transportation from Omaha on the Missouri River at the eastern border of Nebraska overland to the Pacific was nearly 1800 miles by the old Oregon trail. Even by fast stage it was the rare trip that could be made in less than 18 days at a passage cost of \$225.

RAILS REPLACE THE OVERLAND STAGE

Ben Holladay, a swashbuckling Westerner who had operated one of the greatest pre-railroad transportation companies in the West, the Overland Stage Line, a pony express route, as well as Pacific steamship ventures, at one time had owned 75,000 oxen, 2700 horses and mules, 100 stage coaches, as well as 500 quarter horses for

use on his pony express routes. Holladay saw the trend toward rails. He gave leadership and financing to what was originally organized in 1863 as the California and Oregon Railroad Company, established to link Sacramento with Portland, a distance which at the time required seven days of stage travel to complete. Almost immediately after organizing, internal friction caused the Oregon supporters of the line to split into two factions, both of which took the name of Oregon Central Railroad Company and started competitive building on the east and west banks of the Willamette River. The two Oregon Central groups were known as the east siders and the west siders. Holladay joined the east side faction but his group's first rail was not laid until October 26, 1869, and to obtain Federal aid authorized by Congress in 1866, 20 miles of the road had to be in operation by Christmas day of 1869.

Holladay dropped all other activities and personally took over direction of construc-

tion, including a 380-ft. bridge across the Clackamas River south of Portland, which he had nearly completed when a flash flood severely damaged it. The race against time was intensified. Holladay sent his construction engine across the river by barge and while the bridge was being rebuilt, he pushed his line on. One hour short of midnight, December 24, in another near photo finish, the east side railroad won its purse and on Christmas Day, the O. C. R. R.'s J. B. Stephens commenced its regular operation.

Holladay was a driver of men but also less fortunately he proved to be a fast man with a buck. He and his associates squandered money so wantonly that the line, which eventually was to become a part of the Southern Pacific, went over a financial washboard and through a financial wringer nearly a half dozen times before sound reorganization and direction permitted the line ultimately to reach final completion in 1887.

EASTERN SKULDUGGERY

The era after the turn of the half century railroad-wise was one of over-expansion, poor management and not infrequently out-and-out dishonesty. Typical victims were the stockholders of the LaCrosse and Milwaukee Railroad, mulcted of assets by New Yorker Russell Sage. Sage somehow managed to get a \$2,000,000 third mortgage on the road for less than \$300,000 and then, by what the United States Supreme Court termed "a fraudulent arrangement" managed to have his third mortgage given precedence over first and second mortgages in foreclosure proceedings. The stench that accompanied this maneuver turned up the fact that Sage, through the L. M. Railroad's president, had managed to do some first rate buying of political power. In fact, \$842,000 worth of LaCrosse and Milwaukee bonds were handed out where bought influence could cover up the machinations to Sage's and his stooges' best interests. Governor Bashford got \$50,000 worth, and later



The 19-piered, S-shaped, Howe truss wood bridge across the Hudson at Albany, N. Y., 1866, was used by the Central for its famous Red Trains to Buffalo. NY Central



Bridges were numerous where the Central Pacific crossed the Sierra Nevada in California. This train is on the Secrettown Trestle in late 1860's.

SP



Central Pacific builders had no trouble with the Indians in their area. Here a group of Nevada Shoshones study the Champion, an early wood burner.



Stage coaches and trains met at Cisco, California, when that town was rail head as Central Pacific construction moved up to summit of Donner Pass.

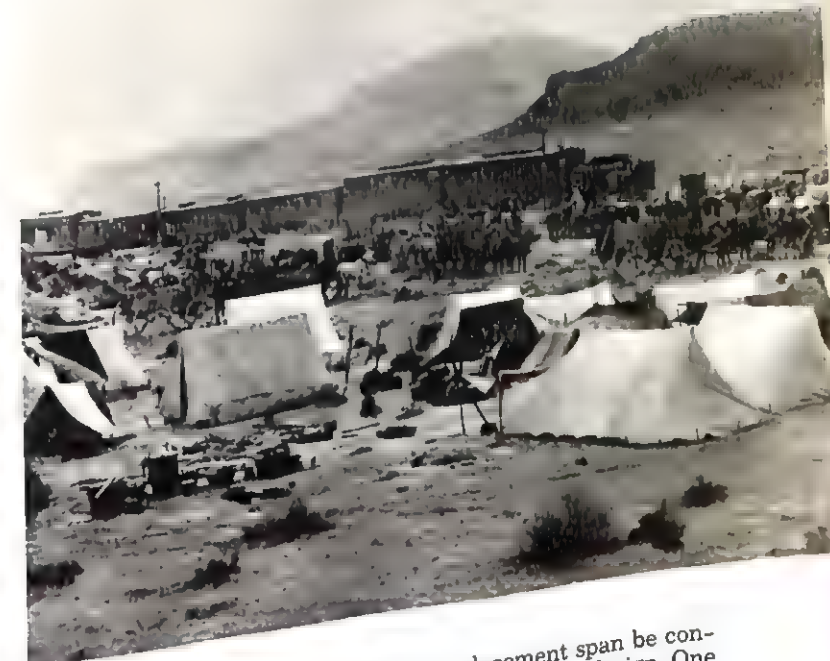
SP photos



One of the first locomotives of the Oregon and California Railroad Company is shown, in this photograph from the 1870's, crossing the rail bridge over Clackamas River in Oregon.

SP

Tents, wagons, frame buildings, and the telegraph line moved west with rail construction. End of the track was on the Humboldt Plains of Nevada when this work camp was photographed in late 60's.



skipped Wisconsin for residence among the less critical citizenry around Tucson in the Arizona territory. Bashford was a lot smarter than the other bribees. He not only took the \$50,000 in bonds but since he had to certify that the first twenty miles constructed by the company was of a satisfactory, A-1 operational condition in order for the company to obtain land grants and Federal subsidy, Bashford refused to do so until the company bought back \$15,000 worth of bonds for cash at par value.

When Sage played around with graft, at least he was no piker, for he saw that \$335,000 worth of the bonds were also planted among state assemblymen, \$175,000

worth were pushed out surreptitiously to state senators, and \$16,000 in bonds went to clerks who were in position to observe any irregularities. Also to protect himself against future repercussions from the press, Milwaukee Sentinel's editor, Rufus King, was reportedly slipped \$10,000 worth with no cash outlay and Morry Schoeffler, editor of the Wisconsin Banner and S. Carpenter, editor of the Wisconsin Patriot, also got \$5000 apiece. Sage's fraud was to plague the predecessor lines of the Milwaukee Road for many years.

The safety of passengers was not always as foremost in the minds of early day railroad entrepreneurs as were speed and

economy of construction. An example of this not overly humane policy occurred on the Cleveland, Painesville and Ashtabula Line. At the turn of the half century, the directors of the line noted that all of its wooden bridges had been rebuilt of iron or stone with the exception of those over the Apparat and Ashtabula Creeks. Apparently all they did through the fifties was to continue to observe this lamentable fact and trust to luck that the old bridges would hold for it wasn't until 1863 that a decision was finally reached to replace a 150-ft. long decayed frame structure across the Ashtabula Gorge.

Amasa Stone, Jr., president of the road,

insisted that the replacement span be constructed of iron to Howe-truss design. One of his engineers pointed out that while the Howe-truss style of bridge which was both quick and cheap to erect was suitable for short span wooden bridges, it should not be used over a 150-foot distance, particularly when constructed of iron, for its own weight even without the added weight of a train would make it dangerous.

Stone refused to listen to the engineer (perhaps influenced by the fact that William Howe, inventor of the design was his brother-in-law) and fired the engineer, hiring another less vocal in objecting to the project. The span went up in a hurry and



Above, passenger trains of the late 1860's stopped when rounding Cape Horn, Calif., so that travelers could get this view of the American River below.



SP photos

Blasting and bridges helped level the mountains of the West for the railroads. A construction train, upper left, is crossing a trestle near Newcastle, Calif.

Two 4-6-0's were used to haul freight on the Central Pacific's Cape Horn run above the American River canyon in the mountains above Colfax, Calif., in 1870.

as Stone had realized, wasn't overly expensive to build. For thirteen years Stone's economy measure seemed to work until the night of December 29, 1876, when the double locomotive drawn Pacific Express with ten baggage, express, coach and sleeper cars attached headed west through a biting snow storm. Just east of Ashtabula, Ohio, on the edge of Lake Erie, the two engineers, Dan McGuire at the throttle of the leading *Socrates* and Pappy Folsom handling the *Columbia*, passed an east-bound freight and steamed onto the bridge. Two locomotive lengths from the far end of the 150-foot span, McGuire felt a sickening motion as if the bridge were melting beneath him. He cracked his throttle and the *Socrates* plunged forward, cleared the abutment and McGuire was on firm roadbed. But the coupling had broken and as

he looked back, McGuire saw the *Columbia* followed by the entire train and bridge plummet to the bottom of the gorge, seventy feet below. McGuire blasted his whistles as a signal for help, then leaped from his locomotive and plunged down the snow-covered embankment. By the time he reached the bottom, the whole train was ablaze. Of 167 passengers and trainmen aboard, only eight escaped without injury. Ninety-two were dead or dying when they were hauled from the pyre.

INDIANS VS. RAILS

Though rate cutting, mergers, double dealings, sloppy management and ruthlessness keynoted much of the rail activity in the East at the time, the western picture was different. Unfriendly Indians still rode the ranges. The mining fever brought with



Cord wood was kept stacked up in high piles around the turntable of the Central Pacific roundhouse at the Rockland, Calif., division point, 1868.



SP photos

Supplies brought up by work train to 14,000 laborers in the Sierras above Auburn, Calif., had often first been the 15,000 miles around Cape Horn.



Forty miles of snow sheds, right, had to be built at high elevations to block the 30-ft. drifts. Today only five miles of these sheds remain.

it an era of gang terrorism. Vigilantes were formed and a period of swift border justice existed.

One group of Cheyenne Indians who witnessed their first steam locomotive tried to frighten the steaming beast into submission and retreat. These foolhardy redskins naively charged the locomotive with their ponies. Twenty ponies were killed along with a goodly percentage of their riders. The Cheyenne's animosity toward the Union Pacific was indelibly stamped in the tribesmen's minds as long as the memory of a blood splashed pilot lasted.

Section hands and surveyors were killed by bow and arrow snipers. In 1867 the Cheyennes kidnapped a complete freight train, burned it and in retaliation perhaps of the earlier head-on collision of ponies versus locomotive, killed the engineer and

fireman. The first two graves at Cheyenne, Wyoming, were those of Union Pacific section hands killed by Indians.

General Dodge, Union Pacific, stated, "Every mile of the route had to be laid within the protective range of the musket." But Indians were not Dodge's only problem. Whiskey peddlers, gamblers, prostitutes, and thugs caused continuing trouble with Dodge's Irish track layers. The Union Pacific very shortly established its own police force under the head of General Jack Casement, Dodge's Police Commissioner, who is credited with the origin of the phrase, "The bad men died with their boots on." And since the Union Pacific's police force was also law, court and when need be, executioner as well, Casement's statement was probably true. Yet despite these problems, the Union Pacific track layers



Heavy construction for snow sheds was necessary to bear the weight of mountain drifts. These were under construction near Cisco, Calif., 1869.



Sheds completely covered the Central Pacific line at the summit of Donner Pass at this time. White building at the left was the summit rail station.



SP photos

Central Pacific workers, before the advent of today's rotary plows, had to struggle with drifts like these on stretches unprotected by the long tunnels of snow sheds.

were trained to drive in ten spikes per rail, four rails a minute and the line moved steadily forward with 400 rails being laid to the mile.

The rowdyism, lawlessness and Indian problems were minor by contrast to graft, bribery and shady financial maneuvering of the Crédit Mobilier which finally came to light as a national scandal in September 1872. Its grandiose graft charges involved U. S. Vice-President Schuyler Colfax, Vice-Presidential nominee Henry Wilson, Speaker of the House Blaine, representatives in Congress by the half dozen, senators and even President-to-be James A. Garfield (whose more recent biographers have vindicated him of charges).

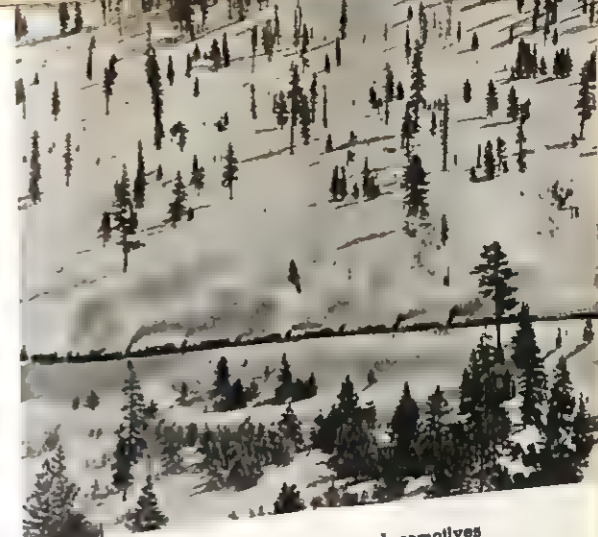
The scandal that forced the Union Pacific into receivership and eventual reorganization quite simply consisted of corrupt practices of the Crédit Mobilier, a Union Pacific construction company whose directors

were also directors of the Union Pacific. It developed that for contractual work which cost Crédit Mobilier approximately \$43,000,000 the contractors were paid \$94,000,000. Politicians involved, of course, had been given stock payoffs in the company in order to approve a highly illegitimate business conducted under government subsidy.

The northern route across the United States from Lake Superior to Portland, Oregon, was financed by Jay Cooke and chartered in 1864. That line went into bankruptcy in 1873 and was not to be completed until 1883. Though the Northern Pacific Railroad's early failure and the collapse of the Jay Cooke and Company banking house precipitated the 1873 financial panic, to the lasting credit of Cooke is the fact that he eventually repaid his creditors. No stigma of purposeful fraud was attached to the line he financed.



High, bucket-type snow plows that pushed drifts from the tracks by the locomotives' forward drive-power were photographed near Cisco, Calif., 1867.



Eight Central Pacific wood burning locomotives push a bucket-type snow plow in 1870 over what today is the overland route of Southern Pacific.



SP photos

San Mateo was a 23-ton wood burner with 5-ft. diameter wheels. It was built for the San Francisco & San Jose RR by Danforth, Cooke and Sons.

RAILS OVER THE MOUNTAINS

In the period through to 1870 no major railroad overcame such tremendous obstacles as those that confronted the Central Pacific Railroad Company, which in 1863 started to move its lines east from Sacramento, California. By May 10, 1869, it had extended 690 miles over the Sierra Nevada Mountains and across Nevada to Promontory, Utah. Four visionary west coasters had the courage and the determination to make this important section of the transcontinental railway possible. They were Collis P. Huntington and Mark Hopkins, partners in a hardware emporium, Charles Crocker, a dry goods store proprietor and later state Governor, Leland Stanford, a grocery salesman. The youngest of the group was Stanford, a man of thirty-six. Hopkins, the oldest, was forty-seven. None of the four had ever been connected with any large construction job.

Theodore Judah had, since 1861, been pushing the idea for a transcontinental road and was partially responsible for the final passage of the Pacific Railroad Bill. Yet Judah, Central Pacific's chief engineer, on the very threshold of what doubtless would have been an outstandingly brilliant career, contracted malaria and died within a week after the first C. P. rail was laid in Sacramento, October 26, 1863, and eight days before the Governor Stanford went into service over rails that would eventually join with the East.

The first section, 31 miles long from Sacramento to Newcastle, was opened to regular traffic June 10, 1864. From that point on, building of the Central Pacific was a rugged deal. Dynamite by this time had been produced but was not in general use so the way through and over the granite walls of the Sierra was made with pick and shovel, one-horse dump carts, hand-driven



Bloomer Cut, on the Central Pacific line between Auburn and Newcastle, Calif., had to be blasted down through conglomerate as hard as concrete.

SP photos

blasting holes and dangerous-to-handle black powder charges. It was strictly a job of hand carving and the only power tools were locomotives that carted supplies to the rail head. But the locomotives, most of the building materials and the cars that hauled the materials, had been shipped 15,000 miles around Cape Horn from the East, a sea voyage of eight to ten months.

White labor was scarce in California in those days for there were too many easier ways for white men to make a living. So Chinese laborers were imported. In some places such was the difficulty of the terrain that the Chinese workers were swung by ropes suspended in baskets down the sides of sheer cliff faces. Their job was to cut foot paths in the cliff's face so that other workers could have standing room to sledge the holes for the black powder charges to blast away the trail for locomotives.

Financial troubles plagued the Central Pacific just as it had most other railroads. The huge private fortunes of the big four leadership was as nothing compared to the tremendous expense involved in cutting a route through the rugged Sierra Nevada. So severe was the winter weather that tunneling work on the 16,059-foot Summit



The Pacific Railroad depot at the Sacramento docks allowed boat connections to San Francisco by side-wheeler paddle steamers down the river.



Tiny 2-2-4 San Gabriel was the first locomotive in southern California. It was placed in service by the Los Angeles & San Pedro RR in January, 1869.

Tunnel and others was saved for this period of the year; grading and track labor was done during the milder seasons.

It didn't take the constructors long to realize that even though the roadbed could be cut through in the milder summer months, something had to be done about the rugged winter snowfalls. Experimental snowsheds were built in the summer of 1867 which that winter proved quite satisfactory. By 1869, forty miles of snowsheds gave the most rugged sections of the mountain run almost continuous solid covering. One engineer was later to remark, "I've squeezed throttle on plenty of railroads from coast to coast but this is the first time I've done my railroading in a barn."

The advent of powerful rotary snowplows gradually did away with the necessity for the snowsheds, so that today less than eight miles of covered track remain.

In 1868, the Sierra Nevada Mountains including fifteen tunnels had been completed and the road had burst out into the more open plain area of Nevada. On June 19, 1868, the railroad's engineers staked out what was to become Reno, Nevada. From there on Construction Superintendent Strobridge's 14,000 Chinese workers. 2000



Atchafalpa, Topeka & Santa Fe Railroad.

TIME TABLE No. 3.

TO TAKE EFFECT THURSDAY, SEPTEMBER 24, 1869.

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1870. Great Central Route! 1870.

Michigan Central

AND

GREAT WESTERN

RAILWAYS.

4 EXPRESS TRAINS LEAVE SUSPENSION BRIDGE

DETROIT.
CHICAGO

GRAND RAPIDS, SAGINAW, MILWAUKEE,
ST. LOUIS, ST. PAUL, BOSTON, PHILADELPHIA, NEW YORK, N. J.,
OMAHA, SALT LAKE, DENVER,
SAN FRANCISCO

AND ALL PORTS WEST TO THE PACIFIC OCEAN.

THE ONLY ROUTE VIA NIAGARA FALLS AND SUSPENSION BRIDGE RAILROADS RUNNING THE
PULLMAN AND WAGNER PALACE SLEEPING AND HOTEL CARS

SPECIAL ACCOMMODATION FOR CALIFORNIA TRAVEL

A SUNDAY TRAIN

1870. Great Central Route! 1870.

NY Central

By 1870 trans-continental rail traffic was featured in posters, and eastern lines vied with each other in claims of advantages over other routes to West.

gold, silver and iron. The Pacific Union Express Company supplied the three and a half pound silver maul.

Thomas Durant of the Union Pacific and Leland Stanford of the Central Pacific handled the silver sledge. And as if to prove that railroad financing and construction work are totally different trades, both V.I.P.s muffed their first swings and dented the fine silver maul on the rail.

At 12:45 p.m. the lines were joined and a telegrapher tapped out the message, "Done"—four letters in Morse code that signaled to the world that the pioneering stage of American railroads had been completed; two bands of steel now joined our nation from coast to coast.

Immediately after the last spike was driven, joining the entire continent by rails, Jupiter of the Central Pacific and No. 119, right, of the Union Pacific moved forward until their pilots touched.



The Jupiter, pulling a special train of dignitaries to the Last Spike ceremony, stopped beside Great Salt Lake to be photographed with covered wagons.

SP photos

The pioneer town of Promontory, Utah, flourished briefly as junction point of the Central Pacific and the Union Pacific, but thereafter faded away.



Souvenir hunters who later swarmed the spot and who secretly hoped to pry out the gold spikes were doomed to disappointment for actually the original laurel tie with its plate and the spikes were removed immediately after the ceremony. Three replacement ties were later stolen, one after another, cut up and sold to gullible souvenir hunters. The laurel tie was destroyed in the San Francisco fire of 1906 but the silver hammer and the golden Hewes spike are today owned by the Stanford Museum at Palo Alto, California.

The lavishness of the golden spikes and silver maul today symbolize the wealth that railroads have been instrumental in bringing to America. •

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